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State Laws Conserving Gas Endorsed As Means of Regulating Production

By Lawrence E. Smith
N. P. N. STAFF WRITER

CHICAGO, Dec. 9

THE American Petroleum Institute, by a majority vote of its board of directors, is now committed to a policy of state legislation to effect conservation of natural gas as a means of regulating crude production.

This action—undoubtedly the most important resulting from the eighth annual meeting of that organization at the Stevens Hotel, Chicago, Dec. 5 to 8—is a direct outcome of that taken at its meeting in Tulsa a year ago, when a committee was appointed to study and report on measures the industry could adopt to secure greater conservation of crude resources.

Deliberations of this committee of seven institute directors, which came to be known as the Marland committee, E. W. Marland, head of the Marland Oil Co. being chairman, attracted a great deal of interest throughout the past year. At an early date it suggested state legislation, and the vote of institute directors at Chicago this week endorsing this suggestion represents a considerable swing in the attitude of many directors on this question over the year.

The conservation issue was the most vital matter before this meeting of the institute, by far the best attended so far, although other business of considerable importance to the oil industry was accomplished there.

The resolution of the Marland committee not only declared for state legislation conserving gas as a means of holding oil in the ground to amounts needed for current consumption; but it also advised efforts to this end by individual operators and by oil companies, through agreements, in the development of new fields.

Still another committee, also appointed a year ago, of which Amos L. Beaty, chairman of the board, The Texas Co., was chairman, reported in favor of state laws to give sanction to cooperative agreements among operators to restrict production when it exceeds demand. Institute directors adopted this report, as was reported in this publication a week ago.

THE extent to which the institute directors hold the conservation discussion vital to the interests of the industry is to be seen in their action reelecting E. W. Clark, vice-president of the Union Oil Co. of California, president of the institute to serve another year, although Mr. Clark early and vigorously declared he could not serve another year. Mr. Clark has directed the policies of the institute on this question for the past year.

The resolution offered by E. W. Marland, chairman of the committee on gas conservation, was adopted by a vote of 26 to 15. This was on Dec. 8 and marked the end of many hours of discussion of the majority report made by the Marland committee. This report was "accepted and filed," and the resolution, putting the Institute on record as favoring state legislation, reflected the tone of the report.

Mr. Marland, after the final session of the directors, disclaimed originality in the matter he and his committee put up to the directors. The discovery of a "way out" of periods of distress caused by overproduction of crude oil was not the achievement of himself or his associates on the committee but of the Federal Oil Conservation Board, he said.

"The board, in its report in 1926, set forth the answer that the oil industry had been groping for over many weary years," he said. "The board said that the control and effective utilization of natural gas occurring with oil was of paramount importance in oil production. The Institute, last December, endorsed that conclusion and appointed the committee of seven to study the question and to suggest means for conservation. We have worked at our assigned task for a year and have come to the conclusion that there must be legislation. This also was suggested by the federal board in its report. To that body must go the credit for showing the way."

THE resolution, adopted by the board, is as follows: "Whereas, the prevention of the waste of natural gas found in oil producing formations is of paramount importance in connection with the economical production and conservation of oil, and

"Whereas, the waste of gas cannot be prevented in an oil pool where there is diversified ownership, so long as any one operator, through ignorance of the above principle, or through selfish disregard for the correlative rights of his neighbors, or through desire to capture more oil than underlies his property, disregards the above principle and continues to waste gas and refuses to cooperate with his

neighbors in adopting preventive measures,

"Now, therefore be it resolved that we, the board of directors of the American Petroleum Institute, favor the enactment of laws to prevent the waste of such gas by the various oil producing states in which natural gas is being unnecessarily wasted."

This resolution is the clearance order. What will be the trains that will run over the track? The Marland committee is continued in existence, although it asked in its report to be discharged. It, therefore, is the committee to plan the next action.

Mr. Marland had no definite suggestion as to the means to be employed in getting conservation laws passed, following the meeting. He does believe that the industry should immediately press for action in the several oil producing states.

"Why immediately?"

"Because," he replied, "the whole business of uneconomic production of oil can be stopped in 30 days time if the oil operators in the various producing states will act vigorously on the plan the Federal Oil Conservation Board has suggested and the American Petroleum Institute has endorsed."

ASKED how many state legislatures will convene in regular session in 1928, Mr. Marland replied that it did not matter if none of them are to so convene.

"All can be brought into extraordinary session and the whole job finished in 30 days," he reiterated.

The committee on gas conservation formulated its final report in the meeting which began in Chicago, Dec. 2, having it ready for presentation to the directors when the institute convention opened. Five members signed the majority report of the committee, these being E. W. Marland, W. S. Farish, S. H. Keoughan, J. Edgar Pew and L. P. St. Clair. The report was endorsed by Thomas A. O'Donnell, but an exception was noted by him in this language:

"I agree with the foregoing report except that part recommending state legislation, which I would limit to the proposition that the gas should all be shut off and not allowed to escape in the air; and that rules and regulations in detail as to how to operate the wells thereafter be left to the petroleum industry itself."

A minority report was filed by Committeeman Henry McGraw.

The committee drew the following resolution as part of its report to the directors:

"Resolved, That we submit a report to the directors of the American Petroleum Institute setting forth the functioning of this committee since its creation by the board in the manner and form as heretofore set forth.

"Resolved, That we reiterate our opinion that the prevention of the waste of gas is of paramount importance in connection with the economical production and conservation of oil.

"Resolved, That we suggest to the board of directors of the American Petroleum Institute that appropriate resolutions should be passed by that board calling upon the industry to adopt every reasonable and practical means to effect the conservation of natural gas in oil bearing formations in the interest of economies in production costs, increase ultimate recovery and in the interest of conserving our supplies of petroleum to meet the demands of consumption, and to the end that proper recognition of the correlative rights of the land owners and lease owners in a given pool may be obtained.

"Resolved, That we suggest to the board of directors of the American Petroleum Institute that it, by appropriate resolutions encourage the cooperative development of oil pools, wherever found with diversified ownership, as the best means of effecting the greatest economies in the production of oil and as the best means of conserving our petroleum resources and that to this end the Institute should now encourage the passage of necessary state legislation to permit the cooperative development of oil pools where there is diversified ownership of lands and where such cooperative development is necessary in the interest of economical production and conservation of oil.

"Resolved, That we suggest to the board of directors of the American Petroleum Institute that it should impress upon its members in the several states where oil is being produced the need for state legislation, or other state regulatory measures, to permit and require the producers of oil and gas in those states to adopt measures to prevent the waste of natural gas found in oil sands.

"Resolved, that this committee suggest that the technical sub-committee of their committee be continued independently, or as a committee by the appropriate Institute division to continue the study of the subject of gas conservation, the efficient utilization of gas and the general technique of production; and that a legal committee, composed of the present members of this committee's legal sub-committee, with the addition of a member from the Rocky Mountain California, Texas and Louisiana-Arkansas districts, be continued to advise the technical committee and to also report to the board of directors of the Institute a recommended standard American Petroleum Institute lease form; and that the board make available the necessary funds for the conduct of activity by these two committees, and the findings of these committees be made available to the industry from time to time."

THE minority report, filed by Henry McGraw, is as follows:

"On the 13th day of December, 1926, a resolution was adopted by the Board of Directors of the American Petroleum Institute at its annual meeting in Tulsa, Okla, providing for the appointment of a Committee of Seven to devise and suggest to the Board or the Executive Committee, such measures as will enable the industry, while continuing to meet the consumption requirements, for petroleum and its products, to conserve in its natural state such reserves of petroleum as may not be required for consumption.

"This Committee of Seven convened in New York City on the 6th day of January, 1927, and prepared a report which was signed by the members thereof. The report advocates, among other things, state legislation looking to the conservation and economic production of oil, and recommending that the members help to formulate and

A. P. I. Directors Elected or Re-elected at Chicago

Members of the board of directors of the American Petroleum Institute, elected or re-elected at the Chicago meeting Dec. 5 to 8, by groups and divisions are:

PRODUCTION GROUP

Pacific Coast—M. L. Requa, San Francisco.
Rocky Mountains—B. B. Brooks, Consolidated Royalty Oil Co., Casper, Wyo.
Central United States—W. C. Franklin, Tidal Oil Co., Tulsa; Frank Phillips, Phillips Petroleum Co., Bartlesville; J. Edgar Pew, Sun Oil Co., Dallas, *H. V. Foster, Indian Territory Illuminating Co., Bartlesville.
Eastern United States—*O. D. Donnell, Ohio Oil Co., Findlay.

MANUFACTURING GROUP

Pacific Coast—E. W. Clark, Union Oil Co. of California, Los Angeles.
Rocky Mountains—T. A. Dines, Midwest Refining Co., Denver.
Central United States—P. M. Miskell, Empire Refineries, Inc., Tulsa; *John L. Gray, Shaffer Oil and Refining Co., Tulsa.
Eastern United States—Charles L. Suhr, Pennzoil Co., Oil City.

DISTRIBUTION GROUP

Rocky Mountain—E. T. Wilson, Continental Oil Co., Denver.
Central United States—H. B. Earhart, White Star Refining Co., Detroit.
Eastern United States—A. P. Coombe, Standard Oil Company of Ohio, Cleveland.

TRANSPORTATION GROUP

Tank Cars—*L. J. Drake, Union Tank Car Co., Chicago.

NATURAL GAS GROUP

*N. C. McGowan, Palmer Corp., Shreveport.

NATURAL GASOLINE—CASING HEAD GROUP

D. E. Buchanan, Chestnut & Smith Corp., Tulsa.

FOREIGN TRADE GROUP

Herbert L. Pratt, Standard Oil Company of New York; E. L. Doheny, Pan-American Petroleum Co., Los Angeles.

AT-LARGE GROUP

J. F. Lucey, Lucey Petroleum Co., Dallas; George H. Jones, Standard Oil Company of New Jersey, New York; Wallace E. Pratt, Humble Oil and Refining Co., Houston; T. A. O'Donnell, California Petroleum Corp., Los Angeles; W. N. Davis, Phillips Petroleum Co., Bartlesville; E. R. Reeser, Barnsdall Corp., Tulsa; H. F. Sinclair, Sinclair Consolidated Oil Corp., New York; George S. Davison Gulf Oil Corp., Pittsburgh; J. W. Van Dyke, Atlantic Refining Co., Philadelphia; H. L. Doherty, H. L. Doherty & Co., New York; *R. C. Holmes, the Texas Co., New York.

*New directors.

help to secure the enactment of adequate state laws to such end.

"At the time of this meeting I was not able to be present and another substituted in my place and assented to the report. Subsequently, this committee had a further meeting in Ponca City, Oklahoma, on October 19, 1927, when the undersigned was present and asked leave to have his vote substituted for that of his proxy, Mr. K. C. Heald, and the Committee at that time permitted the substitution.

"Had I been present at the meeting of the Committee in New York on January 6, 1927, I would not have joined in the report then made and I am still of the opinion that the report in its present form should not have been made, and because of the fact that I find myself in the minority I am impelled to file this minority report with the Executive Committee.

"THE problems facing the Committee were, in their major aspects, the same problems that confronted the Committee of Eleven appointed by the American Petroleum Institute in the year 1925 to investigate the problem of conservation and to report its conclusions to the Institute. This Committee of Eleven, after a thorough investigation, made report to the Institute in the fall of 1925. The gist of said report is found in the 'summary of conclusions' signed by the full committee and reproduced in a lengthy dissertation on American Petroleum—Supply and Demand, which is published in book form and was submitted to the Federal Oil Conservation Board appointed by the President of the United States. This summary of conclusions is short and is, I feel, consistent with the facts as they were found to exist, and as I see the situation, furnishes an unanswerable argument against the legislation proposed by the report prepared by the Committee of Seven on January 6, 1927. The 'summary of conclusions' as published is attached hereto.

"It is likewise pertinent to call attention to the fact that at the public hearing held May 27, 1926, before the Federal Oil Conservation Board at Washington, the Honorable Charles Evans Hughes, counsel for the American Petroleum Institute, with the report of the Committee of Eleven fresh in mind, presented in his forceful way the substantial objections to such legislation as is proposed by the report of the Committee of Seven. Several of the members of the Committee of Seven were present at this hearing and so far as I am advised, they did not then voice any objections to the argument made by Justice Hughes.

"The conclusions reached by the Committee of Eleven in 1925 and the position taken by the eminent counsel for the Federal Oil Conservation Board in 1926, were in my judgment sound at that time and nothing has happened since then to cause me to change my views in the premises."

O. D. DONNELL
President of the Ohio Oil Co. and new director of the American Petroleum Institute for the eastern United States division of the production group

The resolution adopted by the directors brought forth the following vote:

"Yes"

E. W. Marland, Marland Oil Co.; W. S. Farish, Humble Oil & Refining Co.; Thomas A. O'Donnell, California Petroleum Corp.; Wallace E. Pratt, Humble Oil & Refining Co.; T. A. Dines, Midwest Refining Co.; Col. R. W. Stewart, Standard Oil Co. of Indiana; Roy B. Jones, Panhandle Refining Co.; B. B. Brooks, Consolidated Royalty Oil Co.; D. E. Buchanan, Chestnut & Smith Corp.; S. C. Collins, Marland Oil Co.; J. Edgar Pew, Sun Oil Co.; John F. O'Donohue, Petroleum Producers Co.; Charles J. Suhr, Pennzoil Co.; Edward Prizer, Vacuum Oil Co.; John L. Gray, Shaffer Oil & Refining Co.; L. V. Nicholas, Independent Oil Men of America; E. T. Wilson, Continental Oil Co.; L. P. St. Clair, Union Oil Co. of California; H. R. Gallagher, Shell Co. of California; P. M. Miskell, Empire Oil & Refining Co.; L. J. Drake, Union Tank Car Co.; S. A. Guiberson, Jr., Los Angeles; J. W. VanDyke, Atlantic Refining Co.; W. M. Irish, Atlantic Refining Co.; R. D. Benson, Tide Water Oil Co.; M. L. Requa, San Francisco.

"No"

C. H. Kountz, Prairie Pipe Line Co.; W. S. Fitzpatrick, Prairie Oil & Gas Co.; L. L. Marcell, White Eagle Oil & Refining Co.; E. R. Brown, Magnolia Petroleum Co.; A. F. Corwin, Standard Oil Co. of New York; Henry M. Dawes, Pure Oil Co.; W. C. Franklin, Tidal Oil Co.; Frank Phillips, Phillips Petroleum Co.; A. P. Coombe, Standard Oil Co. of Ohio; Frank B. Fretter, National Refining Co.; Walter C. Teagle, Standard Oil Co. of New Jersey; O. D. Donnell, Ohio Oil Co.; George S. Davison, Gulf Oil Corp.; K. R. Kingsbury, Standard Oil Co. of California; W. N. Davis, Phillips Petroleum Co.

Clark Drafted to Serve Again As Institute President

CHICAGO, Dec. 8

OVER-RIDING his vigorous refusal, directors of the American Petroleum Institute today re-elected unanimously E. W. Clark president.

The whole proceeding was one of those events that come to but few men—an event that stirs the emotion of all men.

Mr. Clark had steadfastly refused to let his name be considered. When his friends would start working for him and he would find it out, he pledged them on their honor to keep still. Presumably he thought he had them all sealed up. However, as Mr. Clark's friends pointed out—that pledge didn't bind their friends.

Mr. Clark said that his health was such that he felt he could not stand another full year of Institute and company work. He had done a great deal of traveling and work the past year and next year will be equally strenuous if not more so.

The nominating committee, after canvassing the situation, felt it was impossible to get Mr. Clark to change his ideas and so turned to other possibilities and finally selected William G. Skelly, Tulsa head of the Skelly Oil Co. When Mr. Skelly's name was reported by the committee there was a pause and then first one man after another said that while he would second the nomination of Mr. Skelly, he wanted to make one more trial to get Mr. Clark to accept. Col. R. W. Stewart of the Standard Oil Co. of Indiana, Chicago, made a particularly urgent and personal plea to Mr. Clark. Mr. Clark continued to decline. Finally Mr. Marland moved to elect Mr. Clark. Mr. Clark wouldn't put the question. Then George W. Davison, of the Gulf Oil Corp., of Pittsburgh, jumped to his feet and put the question and declared Mr. Clark elected. Mr. Clark still insisted that he couldn't do it, but his plea was useless.

Mr. Skelly arrived from attending the National Republican Committee meeting at Washington that afternoon and at once heartily commended the directors in insisting upon Mr. Clark's continuing for another year. Mr. Skelly had not been consulted either. He said that, because of the national campaign coming on and other matters, he couldn't have given the time to the job this year.

Once before the directors acted thus. Upon the organization of the Institute the presidency was offered to the late A. C. Bedford, despite his pleas to the contrary. Most of one day was spent in voting him into office and trying to make him take it. Finally the board gave it up.

Mr. Clark, who is executive vice-president of the Union Oil Co. of California, was elected first at Tulsa, in December 1926. He immediately began on a vigorously active administration. Although his home is in Los Angeles and his heavy duties to his company demand his close attention, he gave freely of his time to institute work, making frequent trips from California to New York.

His record for the year 1927 brought general and enthusiastic commendation from the Institute members. He made two public addresses during the year, one at Colorado Springs, in June, at the mid-year meeting which is devoted largely to standardization work, and latterly, at Chicago. The address in Chicago was a forceful analysis of the trend of the oil industry, treating extensively of the conservation subject.

For the three vice-presidencies, the directors elected Axtell J. Byles, president of the Tide Water-Associated Oil Co.; A. B. Macbeth, Southern California Gas Co., and Frank B. Fretter, president of the National Refining Co.

They succeed W. N. Davis, Phillips Petroleum Co.; L. L. Marcell, White Eagle Oil & Refining Co., and R. D. Benson, Tide Water Oil Co.

Judge Amos L. Beaty, chairman of the board of The Texas Co., was re-elected treasurer.

R. L. Welch was reelected secretary and counsel and W. R. Boyd, Jr., assistant secretary and counsel. Lacey Walker again is assistant treasurer.

The new executive committee chosen by the directors is as follows:

The three new vice-presidents and the last retiring president, W. S. Farish, president of the Humble Oil & Refining Co.; George S. Davison, Gulf Oil Corp.; George H. Jones, chairman of the board, Standard Oil Co. of New Jersey; Henry L. Doherty, Cities Service interests; J. Howard Pew, president, Sun Oil Co.; Col. R. W. Stewart, chairman of the board, Standard Oil Co. of Indiana and E. W. Marland, president of the Marland Oil Co.

In addition to the directors who were elected by vote of the membership on the first day's session, the directors themselves elected four more Dec. 7. These were L. V. Nicholas, Independent Oil Men of America; W. S. Fitzpatrick, chairman of the board, Prairie Oil & Gas Co.; W. M. Irish, Atlantic Refining Co. and John F. O'Donohue, president of the Texas division, Mid-Continent Oil & Gas Association. Messrs. Nicholas and Fitzpatrick were among the directors whose terms expired this year. The board numbers 61 members.

Coming Meetings

Michigan Independent Oil Men's Association, Statler Hotel, Detroit, Feb. 2, 3.

Iowa Independent Oil Men's Association, Savory Hotel, Des Moines, Feb. 8, 9.

Ohio Petroleum Marketers Association Spring Convention and Exhibit Exposition, Neil House, Columbus, O., Feb. 22, 23, 24.

American Oil Men's Association, Hotel Stevens, Chicago, March 6, 7 and 8.

American Oil Burner Association, Hotel Stevens, Chicago, April 3, 4, 5, 1928.

Judge Denies Skelly Motion For Reargument

CLEVELAND, Dec. 13.—Judge Hugh M. Morris in federal court at Wilmington, Del., has denied a motion filed by the Skelly Oil Co. for reopening and reargument of the infringement suit brought against it by the Universal Oil Products Co. The judge decided this case several months ago in favor of the plaintiff, the Universal Oil Products Co., holding that the operation of the Jenkins cracking process by the Skelly Oil Co. constituted infringement of a patent issued to Milon J. Trumble and now owned by the plaintiff.

The motion for reopening and reargument of the case was made on the ground that new evidence might be brought out. The judge in his opinion stated, however, that the character of the evidence proposed to be offered is not such as to warrant reopening of the case.

It is expected that in view of the judge's denial of the motion to reopen, the defendant will appeal the case to a higher court.

A. I. M. E. To Meet

TULSA, Dec. 12.—The American Institute of Mining and Metallurgical Engineers Mid-Continent section will hold an open meeting Dec. 19 at 8 p.m. in the auditorium of the Municipal building. The speakers are to be F. B. Hall of the Tidal Oil Co., on "The Selection of Key Wells and Notes on Repressuring Operations"; and J. R. McWilliams of the Skelly Oil Co. on "Insulated Tanks Yield Results in Treating Oil."

Send In Suggestions for Legislation, Invites Committee of Nine

Staff Special

WASHINGTON, Dec. 12

THE burden of initial suggestion for oil conservation legislation has been transferred from the shoulders of the Federal Oil Conservation Board to those of Dr. Work's committee of nine; three members representing the government; three the American Petroleum Institute, and three the American Bar Association.

Formal organization of the committee was effected Dec. 10 with the election of officers, formulating a program to obtain information on oil conservation and the passing of resolutions.

To carry out its task the committee of nine resolved to invite suggestions in writing, to be sent to the secretary of the committee, E. S. Rochester, Room 5139, Interior building, Washington, any time prior to Jan. 10 and commencing Jan. 23 the committee will conduct public hearings for the purpose of developing the views of those who may want to make oral suggestions on the conservation issue. All persons desiring to be heard orally are requested to submit the substance of their proposals in writing to the secretary at the above address prior to Jan. 10. The hearing will be in the Interior building at Washington.

With distinct notes of censure and suspicion the committee of nine was organized. Prof. Henry M. Bates, appointed by the bar association, was elected chairman; Edward C. Finney, assistant secretary of the Department of the Interior, vice chairman; E. S. Rochester, secretary of the conservation board, secretary; and J. H. Williams, an employe of the Department of the Interior, assistant secretary.

It was not until the meeting of the committee that announcement was made by ex-Senator Chester I. Long, head of the Mineral Section of the bar association, of the three members representing the organization. They are Prof. Henry M. Bates, of the Law school of the University of Michigan; James A. Veasey, of the Carter Oil Co.; and Warren Olney, Jr., of San Francisco. These names were more closely guarded than President Coolidge's famous "do not choose" message, prior to the meeting of the committee.

Resolutions were adopted at the organization meeting, one that written suggestions would be received until Jan. 10 then oral suggestions would be received after Jan. 23. A resolution was adopted "that this committee will welcome all constructive suggestions that may be offered by persons within or without the petroleum industry relative to the conservation of gas and oil and the maintenance of ground reserves thereof".

Personnel of Committee

THE following men composed Dr. Work's Committee of Nine to consider legislation pertaining to conservation of oil:

Representing the oil industry—W. S. Farish, president of the Humble Oil & Refining Co.; Thomas A. O'Donnell, chairman of the board of the California Petroleum Corp.; J. Edgar Pew, vice president of the Sun Oil Co. All are past presidents of the American Petroleum Institute.

Representing the government—Walter F. Brown, assistant secretary of commerce; Edward C. Finney, assistant secretary of the interior; Abram F. Myers, Federal Trade Commissioner.

Representing the Mineral Section committee of the American Bar Association—Prof. Henry M. Bates, University of Michigan law school; Warren Olney, Jr., San Francisco; James A. Veasey, of the Carter Oil Co.

"THERE is urgent need" said Dr. Work in addressing the committee of nine "for more wholehearted co-operation by executives of the oil companies actuated by a more thorough realization of the common interest." That was by way of comment on the fact, as he said, that one year had passed since the American Petroleum Institute, at its Tulsa meeting on Dec. 13, 1926, had directed the formulation of a "program of legislation, federal and state" without action either by the Institute or its executive committee, so far as the Federal Oil Conservation Board was aware.

"It is the hope of this board that the committee of nine now about to function will survey the past, present, and attempt to visualize the future in so far as it relates to petroleum development, physical, economic and legal, and determine upon a constructive program in the interest of practical conservation of the country's oil resources," said Dr. Work. "If you can devise a substitute for the present legal procedure which now expresses the primitive instincts of the chase, something that is more in keeping with present-day engineering and economic knowledge, business sagacity, financial conservation, our obligation to the public and national responsibility for our future, then you will have performed a task of constructive statesmanship.

"This cooperative committee of lawyers, engineers, and government representatives should consider only legislation whose purpose would be to protect our oil deposits against unnecessarily rapid depletion and the public against future high prices of those oil products that must continue to be dominant factors in our industrial and social life."

The note of suspicion, or it may have been only one of extreme caution, was furnished by ex-Senator Long, when, in announcing the names of the three men representing the bar association and again in the organization meeting of the committee of nine, he offered the resolution adopted by the committee of nine representing the Mineral Law section of the bar association. The bar association committee of nine referred to the conservation board's committee of nine as the "general committee" so as to distinguish the two bodies. He asked that the resolution be made a part of the record of the conservation board's committee of nine, the bar association's three being designated representatives of the Mineral section committee.

"THE duties of the representatives of this Mineral Section Committee shall be to counsel and advise with the other members of said general committee (the conservation board's nine), in an endeavor to accomplish the latter's purpose" say the resolutions of limitation to which the three bar association members are subject; "provided, these representatives of the Mineral Section Committee are appointed upon the understanding that before giving approval to any measure designed to accomplish the purpose referred to, they shall refer the same to this Mineral Section Committee for its consideration and determination. Upon any such reference, the chairman of the Mineral Section Committee (Chester I. Long) is requested promptly to call a meeting of this entire committee to consider the matter so referred. If it shall be impracticable to obtain the views of

all of the members of this committee at a meeting, the chairman shall adopt any other method he may deem advisable to that end. The members of this Mineral Section Committee are requested to arrange that all of its members shall be furnished with copies of all printed matter from time to time to be issued by said general committee."

The emphasis which the Mineral Section Committee laid upon its supervision over the work of its representatives on the general committee of nine seemed to be displeasing to representatives of the governmental departments. Mr. Long was so insistent as to draw special attention to the fact that his committee intended to keep strong hold on its representatives. At the committee organization meeting he suggested that the Mineral Section committee be furnished copies of everything sent to the general committee as and when received.

"Oh no," said Assistant Secretary Finney, "we can't do that unless we make arrangements to furnish like information to every department concerned." He was right earnest in the way he said that, too. Mr. Long explained that all he wanted was copies of the things which the general committee thought worth considering at the time they were fresh so the Mineral Section committee could keep up with the work of the general committee.

Secretaries Work and Wilbur were the only members of the conservation board present at the time Secretary Davis came in later and Secretary Hoover came in in time to say a few words which may be taken as indicating that he well understands the fear a considerable part of the oil industry feels that any legislation for conservation means regulation of the industry by the government.

"We are anxious to make a solution that does not mean penetration of government into business" said Mr. Hoover. He said he was impressed by the fact that the petroleum industry was alive to the necessity for action. He commended the A.P.I. for its resolution deploring the waste of gas and oil.

Ex-Senator Long thought it well to read the resolution of limitation when he announced the names of the bar association members. In his speech calling the meeting to order Dr. Work had read E. W. Clark's understanding as to the implications caused by his appointment of three members of the committee to represent the American Petroleum Institute, the chief of which was that such appointment was "without implication that the appointment of members of the committee will constitute a commitment on any questions of law or policy involved." The Long limitations and Mr. Clark's understanding that appointment of members of the committee did not commit the A.P.I. on any question of law or policy, caused Dr. Work to make comment in a tone which might have been taken either as facetious or slightly sarcastic.

L. J. DRAKE
Of the Union Tank Car Co., new director of the American Petroleum Institute on the transportation group, tank car division

I am glad to see that the American Petroleum Institute and the American Bar Association have protected themselves against commitments so they have no responsibility other than to work diligently on the subject," said Dr. Work. "You are foot loose. We want the best advice of your best minds. I feel that these limitations are well made. I feel that you are a distinguished committee spending your time, your money and your energy in this work and boarding yourselves."

Dr. Work called on his fellow cabinet members to say something. The two war-machine secretaries pointed out how important petroleum was in the making of war which nobody wanted but which if it had to be made should be made with the most modern machines all of which depended upon petroleum.

"Aviation is built around the gasoline can," said Secretary Wilbur, "and surface ships cluster around a barrel of petroleum fuel." He said of course the navy was experimenting all the time with substitutes, including powdered coal but that up to this time the necessity for depending on petroleum was without question. Mr.

May Co-Operate With Oil Heating Institute

CHICAGO, Dec. 8.—An A. P. I. committee was appointed by directors at Chicago to investigate the educational campaign of the Oil Heating Institute, the organization of domestic burner manufacturers, and to consider appointment of three oil industry representatives to its board of counsellors.

Members are Herbert L. Pratt president of the Standard Oil Co of New York, chairman; J. Howard Pew, president Sun Oil Co. Philadelphia; and W. M. Irish president, Altantic Refining Co. Philadelphia.

Davis said that oil might mean more to the navy than to the army but that army weapons, such as the tank, and army transport, all devised to increase the machine power and decrease man power, must have oil and that all military plans rested upon oil.

Mark L. Requa, George Otis Smith, H. H. Hill and Rear Admiral Rosseau, the three last mentioned being technical advisers of the conservation board, pledged whatever aid they could give. Mr. Requa said the events of the last two or three years had convinced him of the correctness of the position he took years ago in respect to preventing waste and conserving the supply of petroleum. In view of the fact that recovery ran only from 10 to 35 per cent he said caused the country to face a situation which public welfare and national defense required a solution.

* * *

EDWARD C. FINNEY, assistant secretary of the interior, Walter F. Brown, assistant secretary of commerce, and Abram F. Myers, Federal Trade Commissioner, are the government representatives on the committee of nine selected by the Federal Oil Conservation Board.

Mr. Finney has had much experience in oil affairs arising under the public land laws and the national leasing laws. Both he and Mr. Myers have risen from lowest ranks of the government to high positions without political help. Mr. Myers served under Judge W. S. Kenyon as private secretary more than 20 years ago when the judge was assistant to the attorney general and known as a "trust buster". Mr. Myers has risen to assistant attorney general and was author of the government's theory in the recent Patent club litigation on cracking processes.

Mr. Brown is a practical politican from Toledo, O., having served in the days of Sherman, McKinley, Mark Hanna, Herrick and Foraker.

Secretary Work's comment when announcing the three government appointees has caused much comment as it conveys the implication that the committee will be an assistant to the oil board. Chester I. Long, however, has another view as expressed to the writer. That is that whatever the committee of nine might recommend would be considered by the bar association; in other words, the committee would not be an independent body carrying with it endorsement of what he might do from the bar association.

NEW YORK, Dec. 10.—Ingersoll-Rand Co., 11 Broadway, has off the press a bulletin describing its new type XOB belt driven compressor, designed especially for oil field work. It is a compact, rugged little machine and particularly adapted to heavy pumping conditions and transportation difficulties in oil fields.

Federal Commission Exonerates Oil Industry of Price Fixing

Staff Special

WASHINGTON, Dec. 12

THE Federal Trade Commission today exonerated the oil industry of indulging in price fixing and manipulations, in its 300-page report to the senate on its investigation of the oil industry under the Trammell resolution of June 3, 1926. The report was entitled 'Prices, Profits and Competition in the Petroleum Industry."

The Commission reported that over long periods the economic laws of supply and demand functioned although this was not true of short periods, due partly "because crude prices are determined by the decisions of a few large purchasing companies among which there is generally little competition." In another part of the report it was stated that 15 crude oil purchasing companies in 1924 bought 50 per cent of the crude oil produced, in 1925 47.7 per cent, and in 1926, 51.3 per cent.

"There is no spot market for crude petroleum," the commission commented.

Advances of price of crude oil in January and February 1923, 1924 and 1925 and the first five months of 1926 were due, the commission reported, to general anticipation by the leaders of the oil industry that domestic production and imports would be insufficient for domestic refinery requirements.

The commission noted a tendency to regulate the production of crude oil and cited Seminole as an example of regulation under state sanction. The commission deferred to the Federal Oil Conservation Board any recommendations or comment about crude production regulation.

The commission found there was no general simultaneous changes in tank wagon prices of gasoline and that each Standard Oil company acted independently of the others; however, the Independents in the respective territories followed the Standard companies but there was seldom price competition within the territories. Competition for business takes the form of concessions and discounts by all of the companies in the business, the commission reported.

"The wide spread which frequently exists between tank car and tank wagon prices, is the cause of a great deal of the so-called 'price cutting' that occurs at times in many parts of the country" the commission commented.

There are not many complaints of unfair competition, the commission said, but Independent jobbers are concerned about price cutters in their own ranks.

"It is admittedly one of the chief functions of jobbers' associations to keep members from cutting the tank wagon and filling station prices announced by the Standard companies," the commission declared. "The Standard companies and other large companies, when once established in a particular territory, are not complained of much as price cutters."

PROBABLY between 75 and 85 per cent of the gasoline consumed in the United States is sold to the retailer or consumer either by the refining company or by an affiliated or subsidiary organization, the commission said. The Standard companies did approximately 45 per cent of the business in refined products, the same relative volume as their refinery output. The Standard also controlled 25 per cent of the crude oil production, the commission reported. Twenty years ago the Standard had 80 per cent of the refined products.

Each of 11 refining companies—Standard and Independent—consume more than 2 per cent of the crude used in this country. Of this number five are Standard companies whose combined consumption is 42 per cent of the country's total consumption and six are Independent whose combined consumption is approximately 25 per cent of the total.

In marketing these companies have virtually the same relationship to one another and the whole industry as in the refining division, the commission reported.

The Standard Oil Co. of New Jersey, the commission reported, is the most important single company in this country. With its subsidiaries it has approximately 15 per cent of the output of refined goods excepting kerosene of which it has 21 per cent.

Competition by expanding beyond the territories to which the Standard companies were assigned before the dissolution, and by mergers, was noted in the commission's report. Competition among the Standard companies was more extensive in the tank car trade than in the tank wagon and retail trade, the commission said, but only about 1 per cent of the gasoline business of the Standard companies was done outside what is known as "their territories." Some of the largest Standard companies "hold themselves ready to sell gasoline in tank cars to jobbers without restriction as to territory of resale, thus making it possible for the Independent jobber to resell in compe-

tition with them," the commission said. They also found that 179 directors in the oil industry held 458 directorships in companies that cover 70 per cent of the industry, aside from the production of crude oil, "but that in only four cases was the interlocking of directorates such as would have an appreciable tendency to unify control of any considerable part of the industry." Community of interest was largest among the pipe line companies.

"Of nearly 10,000 reported large stockholders in all reporting companies only 163 were found to have as much as 1 per cent or more of the voting stock of each of two or more companies, and only 22 of these were holders of stock in potentially competing large groups. With respect to five individuals and 11 other holders, each of them had more than 1 per cent of the voting stock of the controlling companies in two or more of the Standard groups, and each of six brokerage houses held more than 1 per cent of the voting stock of both Standard and Independent companies," the commission reported. "None of these holdings, however, appears to have any especial significance with respect to control, according to the report. No individual reported as the holder of 1 per cent or more of the stock of two Standard companies is reported as an officer or director of any company in the petroleum industry."

No complaints against railroads regarding transportation of petroleum products has been heard in recent years, the commission said, in contrast with conditions 21 years ago. Pipe lines have widened their availability by lowering the volume of crude they will accept for carriage. Of the 90,000 miles of pipe lines 75,000 miles are classified as interstate lines. Profits of the oil industry were found not excessive although competitive activity has increased. Profits of crude oil companies that reported to the commission averaged from 2.5 per cent in 1923, a year of depression, to 14.7 per cent in the first half of 1926. Refining companies averaged from 5.1 to 11.3 per cent. In the 1921-1923 period pipe line companies' profits averaged 20.3 per cent. For the whole industry, the commission said, profits were larger during and before the war than since.

Some high points brought out by the commission include:

Kerosene production little more than doubled from 1905 to 1926 but gasoline production increased more than fiftyfold.

Falling of in proportion of small companies in the 1909-1919 decade and large gain in number of intermediate and large companies.

Attendance of stockholders at company meetings is small usually under 10 and in the case of the Continental Oil Co. one.

Waite Phillips Made Chairman Of Independent Oil & Gas

Staff Special—By Telegraph
TULSA, Dec. 13

PURCHASE of all properties of the Philmac Co. in the Mid-Continent field was announced by the Independent Oil and Gas Co. following the regular quarterly meeting of the board of directors here Dec. 10.

Waite Phillips was made chairman of the board of the Independent and R. Otis McClintock was elected vice president and placed on the board. Two other additions were made to the board: Gillette Hill, head of the land department of the Philmac, and R. P. Brewer, president of the First National Bank of Tulsa.

The Philmac organization will move to the offices of the Independent at once. Mr. Hill will become head of the land department, A. I. Levorsen, formerly chief geologist for Philmac, will hold that position with the Independent and John E. Curran will be head of the Independent's legal department.

No changes were made in the list of officers of the Independent who were serving prior to the purchase of the Philmac properties. E. H. Moore will continue as president, R. B. Pringle, and J. Donald Duncan as vice presidents, R. M. Riggins as secretary and treasurer, with L. F. Craig and W. A. McKnight as his assistants.

In the Independent Mr. Phillips will be associated again with one of the men who helped him build the Waite Phillips Co. R. B. Pringle, who has been vice president of the Independent for a number of months, was a vice president in the Waite Phillips Co. before it was sold to Blair and Co. for $25,000,000 in 1925.

It is understood the Philmac properties were purchased for cash, but the price has not been announced. Recently Independent stockholders were given rights to subscribe to 150,000 shares of common stock at $28 per share. Stock which was not taken was underwritten by the First Trust Co. of Tulsa. The new issue gives the Independent an outstanding capital of 650,000 shares of no par value. The funded indebtedness of the company consists of $6,500,000 in debentures issued last March. Part of the proceeds of the new stock will be used to buy the Philmac properties.

The Philmac has a daily production of 1,500 barrels, and about 82,000 acres under lease, including 60,500 acres in Texas, much of which is in the New West Texas producing area; 10,000 acres in Oklahoma, much of which is in the greater Seminole district; 11,500 acres in Kansas and 320 acres in New Mexico. These properties have been assembled by Messrs. Phillips and McClintock in about two years' time.

The Independent had about 100,000 acres in West Texas under lease before acquiring the Philmac, as well as a great deal of undeveloped acreage throughout Oklahoma, notably in the Little River district of Seminole, where the company has one well which has been pinched in to 100 barrels per day for some time, indicating a new pool or a long extension to Little River. Independent production now averages about 25,000 barrels per day. The company has a 6,000-barrel complete refinery at Okmulgee.

Announcement was made that there is no other merger of any kind under way or contemplated.

Following is the directorate of the Independent company: Waite Phillips, E. H. Moore, R. B. Pringle, R. Otis McClintock, R. M. Riggins, Gillette Hill, R. P. Brewer and Villard Martin of the law firm of Ramsey, Demeules and Martin, all of Tulsa; and J. Donald Duncan of the law firm of Marshall and Auchincloss; Don M. Kelley of the banking firm of Kelley, Drayton and Converse; and E. P. Currier, vice president of the banking firm of Marshall Field, Glore, Ward and Company, all of New York City.

It is understood Waite Phillips has been acquiring stock in the Independent for some time and that he now owns a substantial interest in the company. Prior to 1922 Mr. Phillips operated as an individual producer in the Mid-Continent. In that year he incorporated his holdings with a capitalization of $12,000,000. The company was always a closed corporation with stock ownership limited to Mr. Phillips and some of his associates in the company. At the time the company was sold to Blair and Co., for merger with the Barnsdall Corp., the Waite Phillips Co. had a production of 12,000 barrels per day, two refineries with a combined capacity of 11,000 barrels per day, 3 natural gasoline plants and about 120 bulk and filling stations.

After a few months' vacation Mr. Phillips organized the Philmac Co. in January, 1926, with Mr. McClintock, who had been a vice president of the Gypsy Oil Co. The Philmac Co. had a capitalization of $2,000,000.

ST. LOUIS, Dec. 10.—Theodore A. Peck, for some time manager of the lubricating oil division of the Independent Oil Men of America, Dec. 1 joined Roxana Petroleum Corp., here as technical assistant to Ralph R. Matthews, manager of the lubricating oil sales division.

Marketers Delve Into Sales Policies; Suggest New A. P. I. Division

By V. B. Guthrie
N. P. N. MANAGING EDITOR

CHICAGO, Dec. 8

POLICIES of oil companies under which petroleum products are sold to the public were frankly analyzed at a group session of the Institute Dec. 8 given over to the marketing branch of the oil industry —the first session the Institute has devoted to this subject.

Existing policies were studied from the point of view of their effect on the financial welfare of the individual company, the oil industry as a whole, and upon the public, and as they might affect the future of the marketing industry.

The frankness with which policies were discussed led many in the audience to remark after the meeting that they believed a step had been taken which might eventually lead to the elimination of some policies which, though continued, are generally looked upon as evils as far as the entire industry is concerned.

As further evidence of the general impression of the practical benefit to come from continued attention given to this subject, a resolution was pased by the session that the Institute create a marketing division to study marketing problems. This resolution was introduced by a long established marketer, T. J. Gay, Gay Oil Co., Little Rock, Ark. E. J. Bullock, vice-president of the Standard Oil Co. of Indiana, who presided at the session, said the resolution would be presented to the directors of the Institute in charge of marketing.

THE policy of oil marketing companies in giving away gasoline pumps and tanks and other equipment was discussed by B. H. Anglin, in charge of sales for the Indian Refining Co., Lawrenceville, Ill. He classed this policy as an evil both to the oil company and the public and suggested that a start towards the elimination of this evil be made by requiring retail agents to pay for underground tanks, piping and installation charges covering non-removable equipment, which cannot be economically salvaged by the marketing company when the dealer takes his business to some other oil company.

Such a plan was advocated by the New Jersey Oil Trade Association, an organization of marketers, some months ago and many equipment companies expressed their approval of such a step.

Mr. Anglin also suggested that the Institute undertake to work out a code of marketing practices whereby, when a gasoline retailing account removed his patronage from one oil company to another, the incoming marketer could take over the first oil company's investment in equipment, subject to proper rates of depreciation. Mr. Anglin said he believed the time was now ripe for the oil industry to start towards doing away with free equipment.

Speaking on the subject "Double Standards", L. V. Nicholas, president of the Independent Oil Men of America, attacked the policy of the major oil marketing companies in creating oversupplies of gasoline and dumping them on the spot market where they come into direct competition with a fair and economically sound retail market, and promote excessive retail competition.

"The refiner, for manufacturing efficiency has released economic forces that tear down his fair and reasonable price structure and cast public discredit and suspicion upon it," said Mr. Nicholas. "The eye is quicker than the mind. The public see our price structure, but our explanations of it are somewhat unconvincing."

The remedy he proposes is for those in charge of marketing policies to stop thinking in terms of individuals, or even individual companies, and to think in terms of the effect of their policies on the industry at large and, even more necessary, upon the public.

That oil marketing companies turn a good part of their sales forces from the task of selling gasoline and other products on the present higher competitive markets to the building of new markets for oil products was proposed by Harry D. Frueauff, of Henry L. Doherty & Co., as a future solution of the problem of marketing. Since present selling efforts, in gasoline at least, are mostly an effort to break down the price structure still further, why not discontinue such efforts entirely, he said. "Perhaps, without such selling, the price of gasoline would be even stronger than it is today."

FUTURE potential markets the industry might develop were analyzed in detail by Mr. Frueauff. He said the oil companies should take over the sales of oil burners for domestic heating from the burner manufacturers, pointing out that reductions in the price of burners might be effected and greater use of burners brought about. He said wider markets could be secured in the marine field, in aviation, on the farm, in road building and so on.

Discussing Mr. Frueauff's address, Edward P. Bailey, head of the Nation-

THE accompanying article reviews the first session at an American Petroleum Institute meeting given over to marketing problems exclusively. Discussion of other matters of interest to oil marketers brought up at this institute meeting and addresses on marketing topics are to be found in another part of this issue, pages 48C to 48P particularly.

Developing Wider Uses For Oil Considered

CHICAGO, Dec. 8.—After D. E. Buchanan, of Chestnut & Smith, Tulsa, director of the institute, had addressed the board on the need for developing new markets for petroleum products through research work and educational work carried on by the oil industry as a whole, the institute directors went on record as "recognizing the need for more diversified application of petroleum and its products to industrial and commercial life of today."

A committee was appointed to consider the desirability of a program of co-operative applied scientific research and, if need for this was seen, to outline a plan for organizing, financing and carrying on this work.

Mr. Buchanan was made chairman of this committee. Other members are Henry M. Dawes, president, Pure Oil Co., Chicago; Axtell J. Byles, president Tidewater Associated Oil Co., New York; Amos L. Beaty, chairman of the board, The Texas Co., New York, and J. Howard Pew, president, Sun Oil Co., Philadelphia.

al Airoil Burner Co., Philadelphia, said that last year, when the report of the Federal Oil Conservation Board was made public, in which it was stated there would be limitations to the use of oil for home heating, sales of burners stopped entirely and that, as a result, sales of burners for 1927 would be from 25 to 30 per cent less than in 1926.

The only remedy for this, Mr. Bailey stated, was for the oil companies to carry on a campaign to convince the public that there would be ample supplies of oil for home heating at a reasonable price for a long period to come.

This suggestion from Mr. Bailey had already been anticipated by directors of the institute, who, Dec. 7, adopted a resolution setting forth that the petroleum resources of the nation were ample to satisfy the growing demand for oil for domestic heating. Directors also appointed a committee of three members to cooperate with the oil heating institute in educating home owners to the advantages of oil heating.

Policies of oil marketing companies in handling credit accounts were gone into by John D. Gill, of the Atlantic Refining Co., Philadelphia. He prefaced his remarkes, to show the present importance of closer scrutiny of oil credit sales, with the statement that the proportion of bad accounts among retail gasoline agents and also among consumer accounts patronizing the company's own service stations were increasing.

H. V. FOSTER
President of the Indian Territory Illuminating Co. A new director of the American Petroleum Institute from the central United States division of the production group

OVERSTOCKING of retail dealers is one cause of bad accounts, Mr. Gill said, particularly at present when the policy of the industry is for more than one oil company, in many cases, to install equipment with the dealer and supply him with products.

"If the retail dealer is himself doing a cash business, then a load-to-load basis of credit extension is all he should ask for or be entitled to," said Mr. Gill.

"He should pay for the first load of gasoline when the second load is delivered to him. If the dealer is himself doing a credit business, and has a limited capital, then he has sometimes to be granted credit, but limited credit. If he does not pay promptly there is a possibility that he is buying tires, accessories and what not with your money. In some cases this is countenanced by the oil company selling him, but at least the oil company should see that its money is going into merchandise or assets upon which the oil company can realize the amount of the credit it has extended, if necessary."

Closer contact should exist between the sales and credit departments, he said, referring to instances where salesmen spent more than half their time in the collection of slow small accounts, in place of making new profitable sales.

Another evil of credit extension Mr. Gill discussed was the policy of an oil company selling a delinquent account of another oil company or in granting greater extensions of credit to their own delinquent customers.

IN SELLING jobber accounts Mr. Gill said these points had to be kept in mind by the refiner or wholesale marketer handling the business.

1—Tendency of jobbers to expand their business to match the physical equipment of their competitors, possibly on money that should be returned to the seller of the oil merchandise.

2—Speculation on the market by buying more gasoline, or other product, than their current needs and requiring the seller to carry them for extended credit.

3—Changes in prices affecting jobbers' inventories, which might make it impossible for the jobber to get as much for the merchandise as he paid for it.

4—Price wars which might sacrifice the margin of the jobber or even more.

Survey of Marketing Practices By Institute Advised

CHICAGO, Dec. 8.—Institute directors announced, after their meeting, Dec. 8, that the desirability of making a co-operative survey of marketing conditions under the direction of the institute had been presented to them and that the following committee had been appointed to consider the matter: P. M. Miskell, general manager, Empire Refineries, Inc., Tulsa, chairman; L. V. Nicholas, president, Independent Oil Men of America, Chicago; H. B. Earhart, president, White Star Refining Co., Detroit; H. R. Gallagher, vice president, Shell Co. of California.

Division of Production Engineering Organized by Institute

By V. B. Guthrie
N. P. N. MANAGING EDITOR

CHICAGO, Dec. 8

THE growing importance of the field of production engineering in the oil industry was recognized by the American Petroleum Institute at its meeting here in its creation of a Division of Production Engineering.

Action of the board of directors in approving the creation of such a division of the institute and appropriation of funds to carry on its work was announced Dec. 7 and technical men active in the production branch of the industry met that same evening to discuss organization of the division and the nature of the work it should undertake. The need for such a branch of the institute was first brought out in the report at the last institute meeting of the Committee on Technical Relationships.

At their organization meeting last night the technical men were first addressed by President E. W. Clark of the Institute who announced that Karl A. Young, standardization director of the institute, would also be the head of the newly created division. Secretary R. L. Welch of the institute spoke on the possible scope and importance of the new branch of institute activity.

For the technical men in the industry John R. Suman, Humble Oil & Refining Co., Houston presided, with T. E. Swigart, Shell Co. of California, Los Angeles, beside him on the platform. When Mr. Suman called for suggestions from the floor it became apparent that the study of conservation of crude, approached from the point of view of the operating engineer, would be the chief matter before the new division. In fact the nucleus of the organization of the division will be the organization of the technical sub-committees of the institute committee of seven on conservation, better known as the Marland committee.

This technical sub-committee organization held a meeting with the main committee of seven, made up of institute directors at Ponca City this fall, where a great amount of data relating to the conservation issue was presented. This data—some 350 pages—is to be turned over to the new division for its use in further study of practical methods of securing conservation through development and operation of oil fields and oil properties.

Chairman Suman was instructed by the meeting to draft a temporary organization for the division, which will probably be similar to that of the sub-committee of the committee of seven. Mr. Suman was active in the work of the sub-committee, being chairman of the Texas-Louisiana division. It is planned to hold the next meeting of the division at Colorado Springs next June in connection with the meeting of the standardization committees and other technical groups of the institute.

IN ADDITION to the accompanying article summing up the organization of a new branch of the institute dealing with production engineering problems, articles on other phases of the producing business taken up at the Chicago institute meeting and papers presented discussing production topics are to be found in later pages of this issue, pages 54 to 69 particularly.

It was suggested at the meeting last night by Max W. Ball, Argo Oil Co., Denver, that the membership of the new Institute division should be wide enough to include pure scientists, such as specialists in chemistry and physics at universities which are carrying on research work in oil production, and, on the other side, practical field men, production superintendents and so on, who, while they may not have an engineer's degree, have valuable experience and data on actual production data which the new division will need in its work.

The practical scope of the work of the division was outlined by Dr. W. P. Haseman, Marland Oil Co., Ponca City, who has taken an important part in the collection of data by the technical men for the Marland committee. "The work of the division will fall into general classifications", said Dr. Haseman. "First, having to do with the development of new oil producing territories and second, with the later production of such territories to secure the maximum of production cheaply."

Proper well spacing is the first problem to be taken up in the first classi-

The Place of the Production Engineer

(Summary of paper presented by A. C. Rubel, petroleum engineer, Union Oil Co. of California, before A.P.I. group session on Development and Production Engineering.)

"THE petroleum engineer is the logical result of a progressive development within the industry to produce an individual fitted by experience, training and education to handle those particular problems which involve the application of engineering methods to the development and production of petroleum.

* * *

"HE IS a translator to the operating and executive members of the industry, capable of assembling technical and scientific principles into practicable workable form for scrutiny and solution.

"HIS most effective employment is by the closest cooperation with executives and field operators, serving as a contact, a correlator between specific problems.

* * *

"AN ENGINEER'S stock in trade is records, and the effectiveness of his efforts can only be in direct proportion to the completeness and accuracy of the information available.

* * *

"WE MUST have an appreciation of the economic effects of his activities on other branches of the oil industry. Changes in producing practices may vitally affect refinery and absorption plant operations, and the economic status of the entire industry—as witness the use of the air-gas lift in Seminole."

fication, Dr. Haseman explained, in outlining a tentative program for the division to follow. This will submit to an economic solution, he said. While the industry is now hampered by lack of facts on which to base conclusions on this problem, it can assume ideal conditions at the start and make considerable headway while actual facts are being gathered and correlated.

The second problem to be taken up of a development nature is that of delayed drilling, said Dr. Haseman, from a practical standpoint how long can the drilling of offset wells be delayed without suffering from loss of production.

Under the second general classification of production problems, Dr. Haseman said he believed some form of pressure control was necessary to secure production cheaply and that the four or five methods of using pressure control in use today would submit to further study to secure improvement in operating methods.

"I believe the performance of producing wells can be approached from the point of view of the law of averages, in the same manner as the insurance business has worked out its longevity tables for humans based on the law of averages. With the thousands of producing wells of the oil industry, the study of a sufficient number of these producing wells should yield data from which we can secure a law of averages for our own use."

Wallace E. Pratt, Humble Oil & Refining Co., Houston, president of the Association of Petroleum Geologists, said the subject of conservation of gas was over the head of the entire industry and that the production engineers of the industry must be organized to proceed with study of that subject if the new division was to be of greatest practical benefit to the industry at large.

John M. Lovejoy, Amerada Petroleum Corp., Tulsa, chairman of the Petroleum Division of the American Institute of Mining Engineers, bespoke the cooperation of that organization in the work of the new institute division.

Others who addressed the organization meeting of the Division of Production Engineering were Fred E. Wood, Midwest Refining Co., Casper, Wyo.; C. D. Watson, Carter Oil Co., Tulsa; J. B. Umpleby, Goldelline Oil Corp., Oklahoma City.

The same group of technical men in the producing branch of the industry met the same afternoon to listen to papers presented by Dr. Haseman, on "The Value of Natural Gas in the Production of Petroleum"; J. F. Hough, of the Portland Cement Association, on "Portland Cement for Shutting off Water in Oil Wells"; and A. C. Rubel, Union Oil Co. of California, on "The Advent and Place of the Development and Production Engineer in the Oil Industry."

* * *

CHICAGO, Dec. 9.—Officers and committee organization of the new Division of Production was announced today. Main officers of the division are: John Suman, chairman; T. E. Swigart, Shell Co. of Cal., vice-chairman; Carl Young, acting secretary.

Regional chairmen are: Fred E. Wood, production engineer, Midwest Rfg. Co., Rocky Mountain district; A. C. Rubel, Union Oil Co. of Cal., California district; C. D. Watson, chief engineer, Carter Oil Co., Mid-Continent district; E. O. Bennett, Marland Oil Co. of Texas, Texas-Louisiana district; Frank M. Brewster, Petroleum Reclamation Co., Eastern district.

Several committees were named. Earl Oliver of Ponca City is chairman of the committee to summarize the report of the technical sub-committees which were appointed by the Marland committee and which technical sub-committees terminate their existence with the creation of the new A.P.I. division.

A. C. Rubel is chairman of the committee on standardization of blank forms for recording production engineering data, such as well production data, gas-oil ratios, etc., also to standardize on types of data that will be needed and to standardize nomenclature.

Dr. W. P. Haseman, of Marland, is chairman of the committee on production research.

C. E. Beecher, of the Empire Companies, is chairman of the committee on production technic.

Hallam H. Anderson, of the Shell Co. of Cal., is chairman of the committee on drilling technic.

Other committees were appointed on metallurgy of oil field equipment; on editing and on by-laws for the division. The latter committee consists of John R. Suman, T. E. Swigart and Max Ball.

In Memory J. C. Donnell

CHICAGO, Dec. 8.—A memorial in honor of the late J. C. Donnell, president of the Ohio Oil Co., Findlay, Ohio, and an active director of the institute, was passed by institute directors today. "His untiring energy in support of the purposes of the institute and his wise counsels in the deliberations of its directors contributed in large measure to establishing the organization on a firm and enduring basis," read the resolution.

Frank B. Fretter, president National Refining Co., Cleveland; T. A. O'Donnell, chairman of the board, California Petroleum Corp., Los Angeles; and Walter C. Teagle, president, Standard Oil Co., of New Jersey, New York, made up the committee.

Lease Form Revised To Allow Pooling

CHICAGO, Dec. 8

THREE oil company attorneys, composing a legal sub-committee of the committee on conservation of gas, made an important contribution to the movement for better functioning of the oil industry, when they reported to the directors of the American Petroleum Institute the tentative draft of a new oil and gas lease form.

NATIONAL PETROLEUM NEWS throughout 1927 urged the necessity for revision of present lease contracts, on the ground that the operator is bound by them to perform many acts that frequently are against his best interests. Lessors and those to whom they sell part of the royalty interest have too much power, it was argued editorially, and there is no flexibility in the contracts under which the industry now functions on privately owned lands. Operators may desire ever so ardently to cease development when market conditions do not warrant it, but their contracts may compel them to go ahead with unprofitable drilling.

The legal sub-committee which drew the suggested lease form is composed of James A. Veasey, general counsel for the Carter Oil Co.; Rush Greenslade, vice-president of the Gypsy Oil Co. and D. A. Richardson, counsel for Marland Oil Co.

In the proposed lease form, one of the most important changes is this:

"Should lessee at any time during the life of this lease pool its interest hereunder with other leases situated upon the same geologic structure for the purpose of the development and operation of all of such leases as a unit, lessee may include the royalty interest in such pooling arrangement and it is agreed that lessor shall be entitled to participate in all of the royalties accruing from the pooled acreage upon the same relative basis as lessee shares in the production from the pooled acreage; lessee to provide lessor with a copy of the pooling agreement."

Had this clause been in leases heretofore, a number of pooling agreements that have been planned would be in effect today. Several big unit operation projects have been "blown up" because of royalty interests.

This sub-committee is continued in existence, along with the main committee, and it is planned to enlarge its personnel to bring in attorneys representing companies operating in territories other than the Mid-Continent. The three members now on the committee are all of Oklahoma.

Refinery Technologists Turn Spotlight On Many Operating Problems

By Paul Truesdell
N. P. N. STAFF WRITER

CHICAGO, Dec. 8

REFINERY technologists and operating men at the meeting of the American Petroleum Institute here, brought out many interesting facts and suggestions concerning almost every phase of the business, both in their prepared papers and in spur-of-the-minute discussions from the floor.

Ralph L. Halloran, Standard of California, told how his company has developed a method of continuously treating cracked distillate by the use of cold sulfuric acid which gives excellent results, reducing greatly the loss by polymerization and by absorption suffered when cracked distillate is treated with sulfuric acid at atmospheric temperature. This new method also reduces the loss of valuable anti-knock constituents which results from acid-treating at ordinary temperatures.

F. McLean Jasper, A. O. Smith Corp., Milwaukee, discussed factors frequently overlooked in figuring safety of pressure containers for use in cracking. He illustrated increased strength obtained by building such vessels with elliptical instead of bumped heads and of reinforcing manways and other openings.

Brian Mead, Humble Oil & Refining Co., said, if the calcium and magnesium chloride are removed from crude oil before it is run to the still, thus preventing the formation of hydrochloric acid when steam is introduced in the distilling process, hydrogen sulfide will not attack the steel or at least will not attack it so vigorously. He said also that ordinary red lead primer, on test panels suspended in a tank of sour oil, has been found to stand up against hydrogen sulfide corrosion so that the steel on which it was painted showed no trace of corrsion after 11 months in the tank.

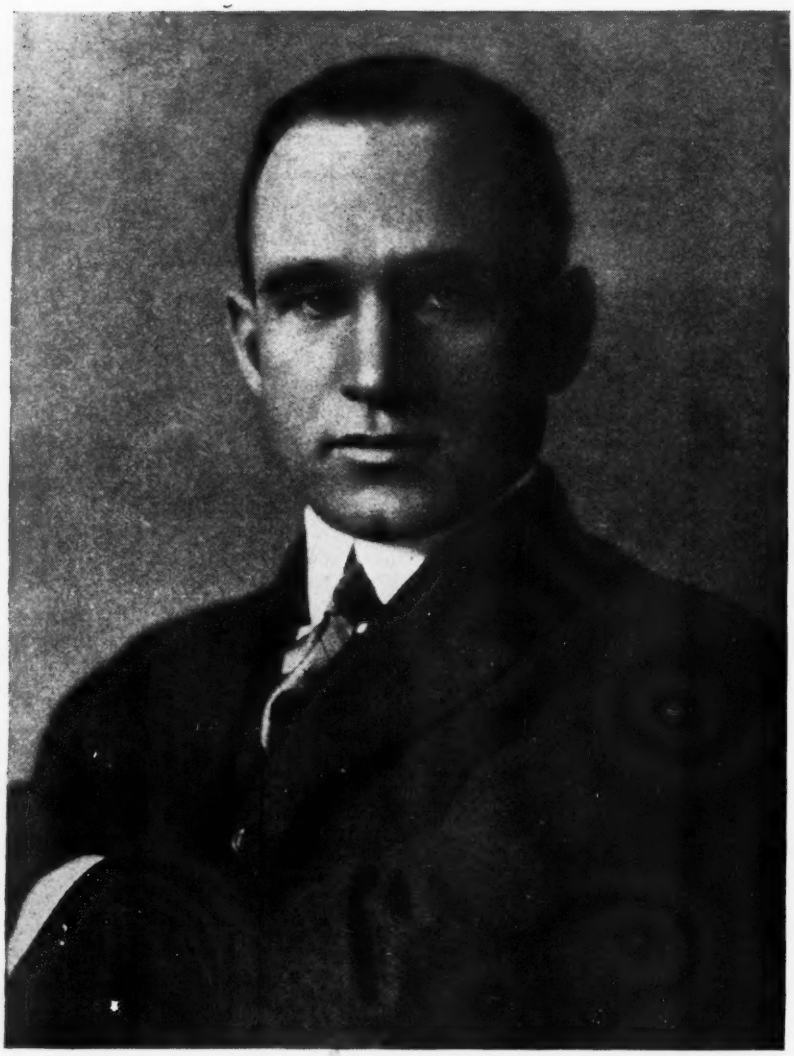
He told that, of the iron gnawed from the cracking equipment in the refinery by corrsion, 86 per cent is carried into the coke in the soaking drum or reaction chamber, the other 14 per cent going out in the streams. Therefore, by taking frequent samples of the coke and analyzing them for iron content, it is possible to keep a fairly accurate check on the rate at which corrosion is proceeding in the equipment. He emphasized the point, however, that this coke analysis does not by any means take the place of periodic careful inspection by drilling the metal of pressure vessels.

THE article by Mr. Truesdell published herewith takes up some of the phases of oil refining discussed at the Chicago A. P. I. meeting. Important papers on both refining and natural gasoline manufacturing delivered at this institute convention appear in later pages of this issue, pages 49 to 54, and pages 73 to 78 particularly.

Dr. Gustav Egloff, Universal Oil Products Co., Chicago, described methods of combating corrosion in the refinery, with the suggestion that chromium or similar alloys may be found economical for construction of equipment subject to severely corrosive conditions, despite the great cost of such alloys.

Mr. Halloran said in his paper that, faced on the one hand with the apparent necessity of holding down the sulfur content of gasoline to safeguard the investment of the American people of $15,000,-

JOHN L. GRAY
Vice-president of Shaffer Oil & Refining Co., new American Petroleum Institute director, in the manufacturing group for central United States



R. C. HOLMES
President of the Texas Corp. New American Petroleum Institute director in the at-large group

000,000 in automotive equipment and on the other hand by the high cost of treating cracked distillate by ordinary methods to produce a gasoline of this low sulfur content, his company instituted research work to find a cheaper and more satisfactory method of treating. How serious this problem is, particularly in California, he set forth in saying:

"The amount of acid required to remove the sulfur from cracked naphtha is in many cases large. As a result of this heavy acid treatment the losses are severe, and, to add to the difficulty, it has been found that the boiling points of the treated naphtha have been raised materially, with a consequent reduction in yield of gasoline fractions. This polymerization loss proves to be the heaviest of the two, amounting in some cases to as much as 30 per cent of the original raw gasoline."

In treating naphtha, said Mr. Halloran, it was found that excessive temperatures developed at the stage where the distillate and acid were mixed.

"Realizing," he said, "that the rate of polymerization of the unsaturated hydrocarbons is accelerated by increase in temperature, some experimental treatments were carried out at low temperatures with most gratifying results.

"The desired reduction in sulfur was obtained with a marked reduction in treating and polymerization losses. Strong sulfuric acid at low temperatures proved to be an excellent solvent for sulfur compounds of the type occurring in cracked naphtha.

"THE development of a continuous process on a semi-commercial scale followed immediately. This plant included the refrigeration necessary to reach the desired temperature which apparently should be as low as possible consistent with thorough mixing. This is, of course, limited by the viscosities of the liquids at low temperatures.

"After establishing the operating conditions in this experimental plant and demonstrating that the use of the process would result in tremendous savings, a commercial plant was constructed. The performance of this plant has fulfilled all expectations, both from an operating and economic standpoint. The acid required for treatment has been reduced over 40 per cent and the treating and polymerization losses are lower by 30 per cent and 70 per cent respectively.

"Other advantages are realized from the fluid nature of the sludge produced and the absence of acid reaction products in the naphtha. These are very desirable improvements, making it possible to increase the capacity of any plant by reason of rapid sludge settling and consequent freedom from emulsion troubles during washing and neutralization.

"It need hardly be pointed out that the advantages of this method of treatment become more apparent the more highly unsaturated the naphtha undergoing treatment. This fact

Refinery Division Turned Down

DIRECTORS of the American Petroleum Institute rejected the recommendation of the committee on technical relationships, headed by E. W. Isom, Sinclair Refining Co., New York, that a division of refinery technology be organized within the institute and that the division publish a periodical to print in full technical papers prepared by members.

Mr. Isom's committee was appointed at the Tulsa meeting of the institute last year, its object being to find a way of centering petroleum technical work under the auspices of the institute. It recommended immediate establishment of a division of refinery technology. The directors stated that they did not wish to close the door to establishment of such a division later but did not feel that spending institute funds now for such a purpose is justified.

At the meeting at which the decision of the directors was announced, the refinery technologists, on motion of Dr. K. G. Mackenzie, The Texas Co., New York, formed the "Committee on Refinery Technology" and elected the following officers: E. W. Isom, chairman; N. E. Loomis, Standard of New Jersey, vice chairman; and Dr. R. P. Anderson, technologist American Petroleum Institute, secretary.

was demonstrated by applying the method to a vapor phase naphtha containing more than 60 per cent of olefins. A well refined, sweet gasoline was produced with nominal treating losses, while the copper bowl test on the finished product was found to be comparable to that on straight run gasoline. Anyone familiar with the gum forming tendency of vapor phase gasoline will appreciate the significance of this.

"THE plant which we are now operating has a capacity of 10,000 barrels of naphtha daily. An ammonia compressor plant rated at 1,100 tons of refrigeration furnishes the cooling required.

"The crude naphtha is given a preliminary caustic treatment and, after washing and settling, is finally dried by contact with spent acid which is returned to this part of the system from the sludge settler. Drying is necessary to remove water which would otherwise freeze in the cooling coils during the subsequent operation.

"After settling and removal of the acid the naphtha is cooled to a temperature approximately 25-30 degrees Fahr. below the maximum temperature desired for the treatment, that is, to about 5 degrees below zero Fahr. This cooling may be done in one or more stages and is carried out in specially designed coolers, the naphtha flowing through coils which are surrounded by ammonia. These coolers are termed pre-coolers to distinguish them from the reaction coolers which follow the acid treatment.

"From the precoolers, the naphtha passes to the acid mixers where the acid is applied in two or more stages. For convenience, centrifugal pumps are used which serve both as mixers and booster. The application of the acid in several stages permits of better temperature control and provides for the absorption of some of the heat of reaction in coolers after each mixing pump. The distribution of acid between the mixers is such that the temperature is the same after each application, this temperature being the desired maximum.

"EACH application of acid is followed by another cooling of naphtha and sludge in a reaction cooler, and the mixed naphtha and sludge then pass to sludge settlers where the latter is removed, and finally to water washers and caustic treaters for the neutralization process. The water washing and neutralization steps take place at ordinary temperatures.

"The treated naphtha is re-run for test gasoline, using fire and steam rather than the conventional steam still, thus effecting a saving in fuel and an increase in fractionating efficiency."

The corrosive nature of various crudes was explained by Dr. Egloff

N. C. McGOWEN

Palmer Corp., at Shreveport, and new director of the American Petroleum Institute in the natural gas group

in some detail in his paper and the effectiveness of different reagents on neutralizing the corrosive properties of the crude gone into from the point of view of offering refiners a practical means of combatting the cost of handling these crudes. A portion of Dr. Egloff's paper follows.

By Dr. Gustav Egloff.

CORROSION is not a function of the percentage of sulfur compounds present in the crude oil. Luling and Panhandle crude corrode several times faster than oils having twice their sulfur content. The blending of high sulfur with lower sulfur crudes will not necessarily mean that the corrosive properties will be proportionate to their percentage presence in the mixture, but may give a higher corrosion rate than if the oils were handled alone.

Chemical injection of ammonia, hydrated lime, sodium hydroxide or sodium carbonate cuts down corrosion. Ammonia or ammonium hydroxide neutralizes hydrogen chloride and some sulfur compounds. Hydrated lime is effective in cutting down corrosion 50 per cent or more with some oils and is apparently not so effective with other oils. Lime is effective in cutting down the difficulty of coke removal from heating tubes and reaction chambers of pipe stills.

Caustic soda or sodium hydroxide is not as good a reagent to use as lime, due to its chemical reaction with steel at the temperatures employed during distillation. It also causes embrittlement of the steel. It also produces a denser coke which is more difficult to remove from the heating tubes.

The use of aluminum for roofs of of storage tanks, look boxes, treater tops, pipe linings, should be effective when corrosive oils are to be handled. Hydrogen sulfide does not react at all with aluminum.

Steel tube life may be prolonged by increasing the wall thickness. It is desirable to establish an index rate of corrosion of refinery equipment and replace parts when the factor of safety has been exceeded.

Chrome iron tubes have been in service over a year and no sign of corrosion, internal or external, has been noted. Chrome iron tubes have

relatively low shock resistance and tendency toward embrittlement increases with increasing percentages of chromium.

The coke adherence to chrome iron tubes is markedly less than with steel tubes.

Chrome-nickel-iron alloys have been experimented with, but no conclusions can be drawn at the present time.

The ultimate answer from an industrial standpoint has not been given as to the percentages of chromium or nickel, or combinations thereof, which will give the greatest economic results in combating corrosion. A great deal of experimental work is yet to be done.

Chromium plating of tubes internally has not worked out in a satisfactory manner under service conditions. The flue cleaners used to clear tubes of cokey material have a tendency to cut through the plating. There is also a tendency for the plate to peel off. Tubes which were externally plated withstand oxidation from products of combustion very well.

Thick walled calorized tubes are apparently giving satisfaction in some installations.

Return bends for the tubular portion of pipe stills show under test conditions of over 3100 hours while cracking 134,000 barrels of high corrosive oil, that cast steel is superior to drop forgings of the order of 1/16-inch to ¼-inch, or 4 : 1. This has been checked in other plants.

Key type return bends of cast steel, using tapered steel forged plugs, have stood up over a year with negligible corrosion taking place when operating on Luling crude oil, the highest corroding oil that has come within my experience.

Chromium plated and calorized return bends have not given satisfaction so far.

Building up a surface of chrome iron upon return bends is being experimented with, but no conclusion can be drawn at this time as to its value.

Plugs of various composition have been used of the screw and tapered type, of cast steel, forged steel, chrome iron, chrome iron nickel, and chromium plated.

Proper metals for the return bends and plugs must be used so as not to produce an electric potential; hence avoiding a corrosive effect, due to a high difference of potential.

Cast steel return bends with forged steel plugs have worked out satisfactorily.

Chromium plated plugs have not worked out satisfactorily, as yet, due to the plate peeling off.

Field inspection of many reaction chambers which have been subjected to high temperature and pressure conditions while cracking oils showed practically no corrosion over a period of 4 years for some vessels, while others gave a corrosion rate of as high as 1/16 of an inch per month.

Reaction chambers and dephlegmators may be built of steel walls thick enough to permit corroding away, and yet have an ample factor of safety. Sheer weight of metal is one way of combating corrosion, but it is a makeshift.

Lining of chambers with boiler plate or resistant alloys has worked out fairly satisfactorily, particularly in limited areas, where maximum corrosion takes place. However, it is a difficult matter to obtain a tight joint by welding, which will not crack or tear away, so that the corrosive gases will not pass behind the liner.

Chromium plating of chambers 10 by 30 feet presents technical difficulties of first magnitude, yet it has been successfully accomplished and chromium plated chambers have been in service over a year, and they are resisting corrosion in a remarkable way. Chromium plating apparently has solved the problem of corrosion in large vessels.

It may well be that pipe lines, storage tanks and much refinery equipment will be chromium plated, in order to resist corrosion, as soon as all the technical details have been thoroughly worked out.

There is a desire on the part of some fabricators of steel vessels to build them of chrome iron alloys. This would solve the problem of corrosion. However, the cost would probably be prohibitive—it would be of the order of 10 : 1 of steel.

The building up of alloy metals, by welding with electricity, hydrogen, or acetylene, upon the surface of the vessel looks very promising. The problem is to produce a close adhering surface interpenetrating with the steel. The method is still experimental.

Service pumps, either for cold or hot oil use, no longer give serious trouble due to corrosion. The problems have been solved by the use of proper metals, such as cast steel, chrome iron, or chrome-nickel-iron.

Corrosion of valves has been solved by the use of cast steel, forged steels with or without the use of chrome iron, chromium-iron nickel as part of the valve. Some valves have been fabricated containing 17 per cent of chromium which resist corrosion to a high degree.

The use of paints as corrosive resisting material has some promise of success, but is still in the experimental stage. Some paints show real resistance to corrosion. A field inspection of a large chamber, which had some shop letters painted on the inside, showed it to be highly resistant to corrosion in the letter portion. The painted letters showed up as raised and underneath no sign of corrosion, while the balance of the chamber wall around the letters showed corrosion of from 1/16 to ⅛ of an inch.

Gun spraying of metals or alloys upon surfaces has promise of success with certain type of equipment. Commercial tests are going on spraying aluminum, lead, zinc, monel metal, chrome iron, chrome-nickel-iron, upon refinery installations such as treaters, storage tanks and parts of distillation equipment. Sprayed metals show certain advantages dependent upon the type equipment and the use to which it is to be put.

Nitralloys have some promise of being useful in resisting corrosion in refinery equipment. It is still in an experimental stage. Some cracking chambers have shown evidence of nitrogenization of the still yielding a very hard surface that drills available would not pierce. This phenomena which took place was probably due to nitrogen or nitrogen compounds such as ammonia evolved from the oil.

Methods Of Testing Anti-Knock Favored

CHICAGO, Dec. 9

DISCUSSION in the group sessions devoted to motor fuel, at A.P.I. meeting, developed the sentiment that we are not quite so badly off as many think in regard to a method of testing anti-knock value of fuels and that the American Society for Testing Materials' standardized Engler distillation test is not as poor a guide to volatility of the fuel as has been thought.

At the first group session, Dr. H. C. Dickinson, of the Bureau of Standards, Washington, reported on the status of the cooperative motor fuel tests that have been under way for three or four years by the Bureau cooperating with the Society of Automotive Engineers, Automobile Chamber of Commerce and American Petroleum Institute.

From his paper and those of other Bureau of Standards men, O. C. Bridgeman, C. S. Cragoe, R. Best, J. O. Eisinger and H. K. Cummings, it appears that, having settled certain points in connection with the quality of motor fuel, the Bureau's experts are now going ahead to work on anti-knock problems. Approval of this was general.

In the paper by Messrs. Cragoe and Bridgeman, read by the latter, it was shown that in a number of tests of volatility of gasoline, made by the Sligh method, results were obtained which checked well with tests of volatility made by the A.S.T.M. distillation method.

R. E. Wilson, Standard Oil Co. of Indiana, who did considerable work several years ago on a dew point method of determining volatility, said the facts brought out in Cragoe and Bridgeman's paper proved that "we do not need any fancy method" for testing gasoline volatility.

Dr. Graham Edgar, chief technologist, Ethyl Gasoline Corp., read a paper in which he reported on a number of tests carried out.

Wheaton Anti-Freeze Valve

This Valve Can't Freeze

Because It Drains Dry

THIS Wheaton Anti-Freeze Valve is especially designed for drawing off water which settles at the bottom of storage tanks.

The valve seat is located *inside* the tank, while the valve body is located *outside* the tank, so that when the valve is closed the liquids are excluded from the body and the valve drains *dry*. With this accomplished, the danger of the valve body freezing is removed.

Many of the largest oil companies in the United States have adopted the Wheaton Anti-Freeze Valve for drawing water from the bottom of their storage tanks. They have found it ideal for this purpose, for it not only drains all the water from the tank, but, since no water ever remains in the body of the valve to freeze, there is no danger of the valve breaking and causing leakage.

From style to strength, this Anti-Freeze Valve is of Wheaton Quality. It is made of the same special-analysis, non-corrosive, non-crystallizing brass alloy—tempered, toughened and tested—which is found in all Wheaton Faucets and Valves. The extraordinary quality of this high-grade brass alloy, together with the fine fit and finish of the valve, assures perfect operation and long life. Sizes: ¾, 1 and 2-inch.

Write today for a sample. If it does not prove entirely satisfactory you may return it for full credit or refund. Also, ask for a copy of the Wheaton Catalog, which fully describes and illustrates all the other Wheaton Products.

A. W. WHEATON BRASS WORKS, NEWARK, N. J.

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FAUCETS · VALVES · JOINTS · COUPLINGS · FILLERS · NOZZLES · FITTINGS

Compilation Of Mid-Continent Refinery Operations

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Mid-Continent Refinery Operations Week Ended December 9 (By Telegraph)

	Kansas	Oklahoma	North & Cent. Texas	North La.-Ark.	Total Week Ended Dec. 9	Total Week Ended Nov. 11
Plants Reporting	12	28	27	12	79	79
Crude Capacity (bbls.)	92,000	157,200	104,500	54,900	408,600	408,600
Cracking Capacity	30,700	52,600	16,200	22,700	122,200	122,200
Da. Av. Crude Runs	55,727 + 0.3	107,608 + 7.1	69,418 + 14.3	39,229 — 2.1	271,982 + 5.9	277,799
Da. Av. Other Oils	2,792 — 55.7	—747	5,793 — 30.5	1,335 — 12.7	9,173 — 54.3	18,468
GASOLINE—Gallons						
Stocks, Dec. 2	10,629,000	34,048,000	17,808,000	3,523,000	66,008,000	59,178,000
Prod. 12-2 to 12-9	7,425,000 — 14.7	16,090,000 + 9.2	7,963,000 + 9.5	3,437,000 — 4.8	34,915,000 + 1.7	36,723,000
Ship. 12-2 to 12-9	7,110,000 — 14.7	13,964,000 — 5.8	7,951,000 + 6.4	3,627,000 — 17.3	32,652,000 — 6.8	34,403,000
Stocks, Dec. 9	10,944,000 + 3.0	36,174,000 + 6.2	17,820,000 + 0.1	3,333,000 — 5.4	68,271,000 + 3.4	61,498,000
Ratio Sales to Prod.	95.8%	86.8%	99.8%	105.5%	93.5%	93.7%
KEROSENE—Gallons						
Stocks, Dec. 2	4,287,000	7,140,000	2,238,000	883,000	14,548,000	11,075,000
Prod. 12-2 to 12-9	1,612,000 + 8.1	2,812,000 + 12.0	1,274,000 — 22.6	635,000 — 2.9	6,333,000 + 0.5	6,544,000
Ship. 12-2 to 12-9	1,256,000 — 10.9	2,864,000 — 3.1	1,441,000 + 2.9	845,000 +164.1	6,406,000 + 5.2	5,583,000
Stocks, Dec. 9	4,643,000 + 8.3	7,088,000 — 0.7	2,071,000 — 7.5	673,000 — 23.8	14,475,000 — 0.5	12,036,000
Ratio Sales to Prod.	77.9%	101.8%	113.1%	133.1%	101.2%	85.3%
STOVE DISTILLATE—Gallons						
Stocks, Dec. 2	4,657,000	6,357,000	2,193,000	29,000	13,236,000	14,774,000
Prod. 12-2 to 12-9	177,000 — 53.8	432,000 + 49.0	250,000 — 33.0	61,000 +408.3	920,000 — 13.0	1,436,000
Ship. 12-2 to 12-9	623,000 + 9.9	1,088,000 + 71.9	668,000 + 79.6	49,000 +250.0	2,428,000 + 53.1	1,967,000
Stocks, Dec. 9	4,211,000 — 9.6	5,701,000 — 10.3	1,775,000 — 19.1	41,000 + 41.4	11,728,000 — 11.4	14,243,000
Ratio Sales to Prod.	352.0%	251.9%	267.2%	80.3%	263.9%	137.0%
GAS OIL—Gallons						
Stocks, Dec. 2	8,704,000	41,809,000	17,007,000	8,409,000	75,929,000	75,727,000
Prod. 12-2 to 12-9	1,379,000 — 6.7	1,768,000 — 55.6	971,000 — 47.6	1,570,000 — 22.1	5,688,000 — 39.0	6,492,000
Ship. 12-2 to 12-9	1,775,000 + 15.3	2,470,000 — 40.6	2,405,000 — 13.0	2,052,000 + 1.7	8,712,000 — 16.9	5,151,000
Stocks, Dec. 9	8,308,000 — 4.5	41,107,000 — 1.7	15,573,000 — 8.4	7,917,000 — 5.9	72,905,000 — 4.0	77,068,000
Ratio Sales to Prod.	128.7%	139.7%	247.7%	131.3%	153.2%	79.3%
FUEL OIL—Gallons						
Stocks, Dec. 2	16,159,000	42,336,000	36,411,000	8,946,000	103,852,000	104,254,000
Prod. 12-2 to 12-9	6,162,000 + 2.2	7,291,000 + 28.0	9,605,000 + 29.3	5,583,000 — 3.1	28,641,000 + 15.0	31,153,000
Ship. 12-2 to 12-9	6,270,000 + 1.4	8,795,000 + 17.0	7,840,000 — 1.0	5,149,000 — 2.5	28,054,000 + 4.3	29,418,000
Stocks, Dec. 9	16,051,000 — 0.7	40,832,000 — 3.6	38,176,000 + 4.8	9,380,000 + 4.9	104,439,000 + 0.6	105,989,000
Ratio Sales to Prod.	101.8%	120.6%	81.6%	92.2%	98.0%	94.4%

Gasoline Produced by Various Methods, Week Ended December 9

	Kansas	% of Total	Oklahoma	% of Total	Texas	% of Total	Arkansas	% of Total	Total	% of Total
Straight Run	5,121,000	69.0	12,047,000	74.9	6,612,000	83.0	1,605,000	46.7	25,385,000	72.7
Cracked	1,698,000	22.9	3,029,000	18.8	1,098,000	13.8	1,324,000	38.5	7,149,000	20.5
Natural	606,000	8.1	1,014,000	6.3	253,000	3.2	508,000	14.8	2,381,000	6.8
Total	7,425,000		16,090,000		7,963,000		3,437,000		34,915,000	

+ or — columns are % changes over previous week.

Cold Wave Increases Demand for Distillate and Fuel

Staff Special—By Telegraph
TULSA, Dec. 13

SHIPMENTS of stove distillate from refineries in the Mid-Continent increased sharply in the week ended Dec. 9, according to reports to NATIONAL PETROLEUM NEWS from refiners that have about 60 per cent of the active operating capacity of the field. The cold wave in the middle west brought demand to the highest level since last January.

Shipments from 79 plants totaled 2,428,000 gallons, compared with 1,586,000 gallons the previous week, an increase of 53.1 per cent. Total production for the week was only 920,000 gallons, causing refiners to draw 1,500,000 gallons from storage. Dec. 9 stocks were down to 11,728,000 gallons. Dec. 10, 1926, the same

Summary for the Month

Production and shipments, all reporting refineries, for four weeks ended Dec. 9. Change in stocks figured from Nov. 11.

GASOLINE

	Gallons
Production	141,936,000
Shipments	135,163,000
Net change in stocks	+6,773,000
Ratio sales to production	95.2%

KEROSENE

Production	25,965,000
Shipments	23,526,000
Net change in stocks	+2,439,000
Ratio sales to production	99.6%

STOVE DISTILLATE

Production	4,410,000
Shipments	6,925,000
Net change in stocks	—2,515,000
Ratio sales to production	157.0%

GAS OIL

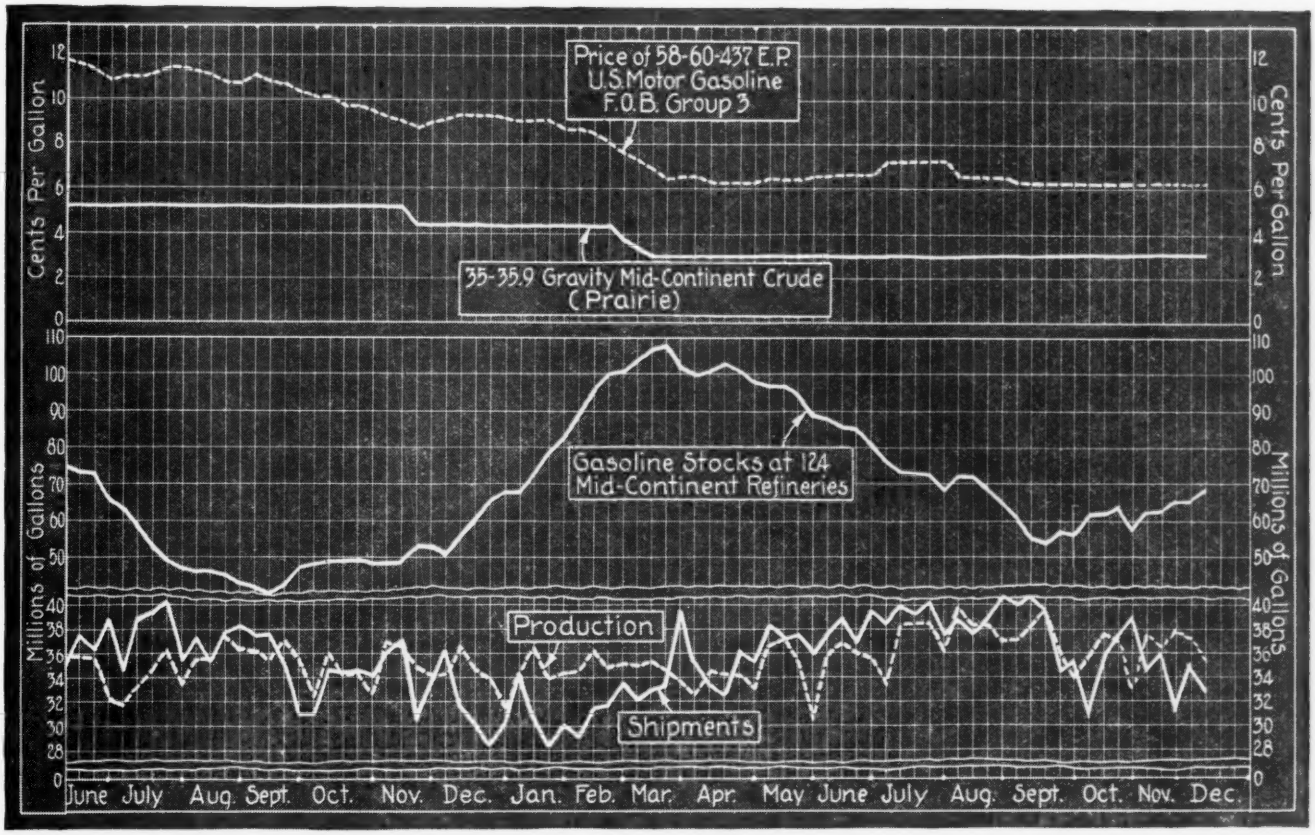
Production	26,871,000
Shipments	31,034,000
Net change in stocks	—4,163,000
Ratio sales to production	115.5%

FUEL OIL

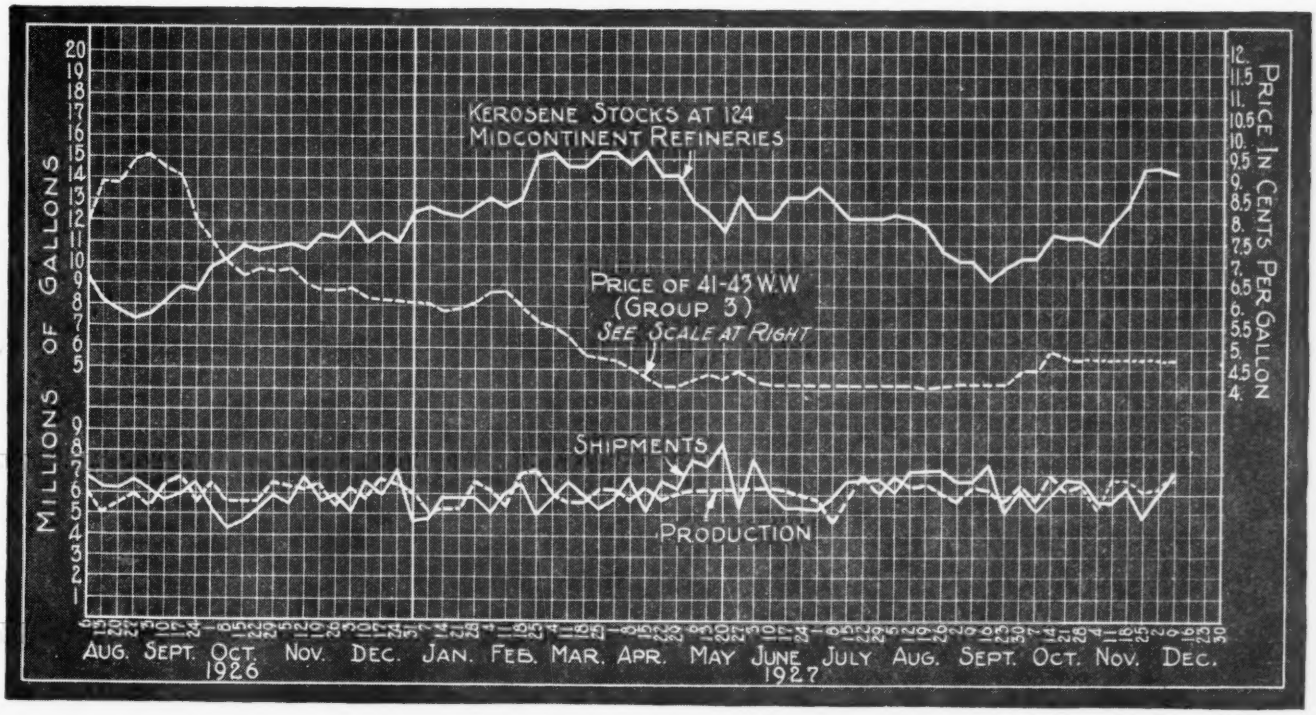
Production	109,111,000
Shipments	110,661,000
Net change in stocks	—1,550,000
Ratio sales to production	101.4%

Barometer of Mid-Continent Refinery Market—Week Ending December 9

Charted Course of Prices, Production, Shipments, Stocks of Principal Refined Products, Week by Week, From Reports Made by 124 Plants to National Petroleum News



Prices shown above are extended to date shown in Refinery Market and Crude tables in Market section of this issue and stocks, shipments and Production are extended to date shown in table on opposite page



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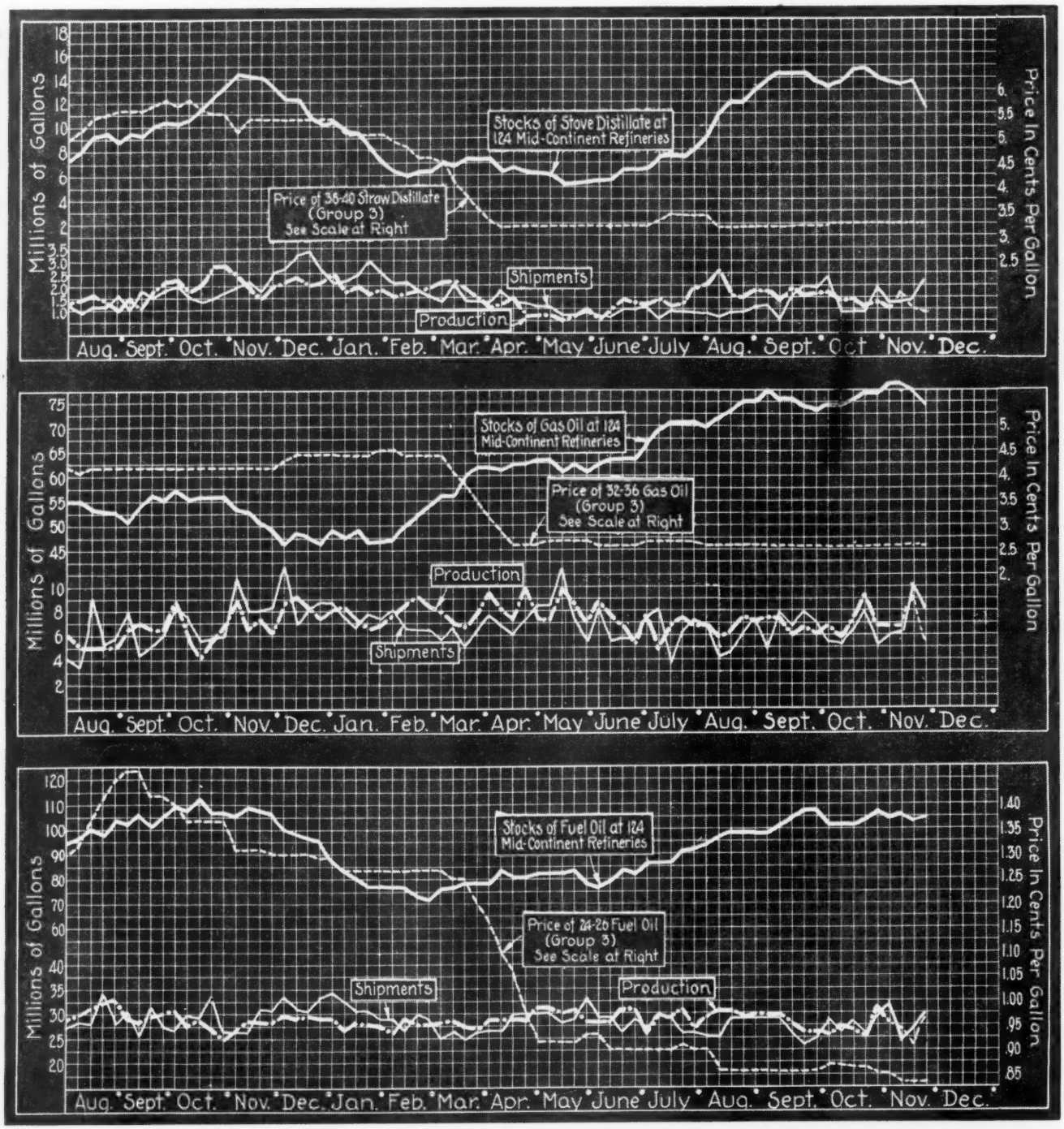

Millions of Gallons
Price In Cents Per Gallon
Stocks of Stove Distillate at 124 Mid-Continent Refineries
Price of 36-40 Straw Distillate (Group 3) See Scale at Right
Shipments
Production
Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
Millions of Gallons
Price In Cents Per Gallon
Stocks of Gas Oil at 124 Mid-Continent Refineries
Price of 32-36 Gas Oil (Group 3) See Scale at Right
Production
Shipments
Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
Millions of Gallons
Price In Cents Per Gallon
Stocks of Fuel Oil at 124 Mid-Continent Refineries
Price of 24-26 Fuel Oil (Group 3) See Scale at Right
Shipments
Production
Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

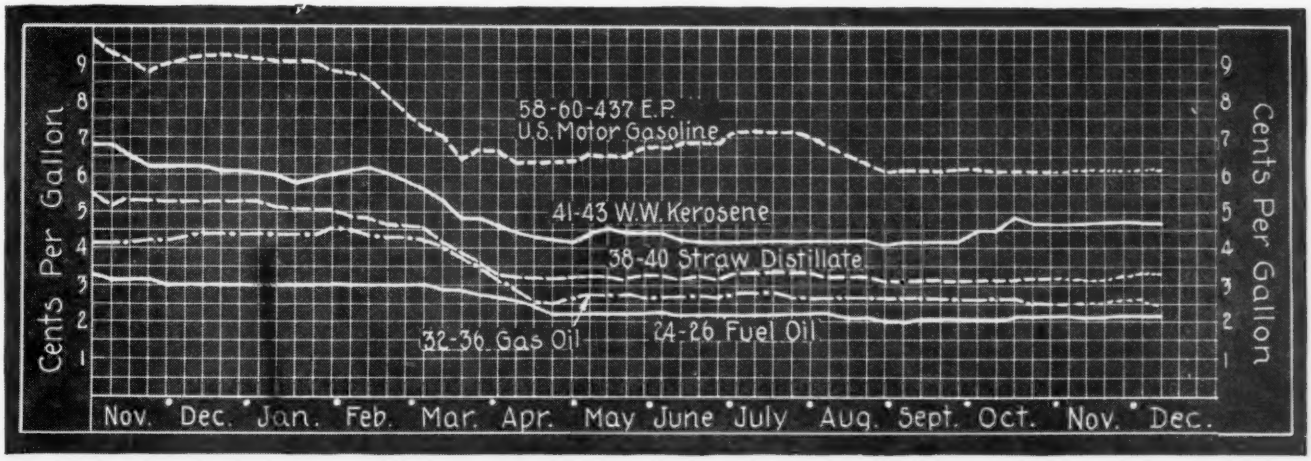
group of plants held 12,046,000 gallons in storage.

The cold weather likewise caused an increase in demand for kerosene. Shipments were 6,406,000 gallons, compared with 6,087,000 gallons the week before, an increase of 5.2 per cent. Production of kerosene at all reporting plants for the week was 6,333,000 gallons. Stocks were reduced 73,000 gallons to 14,475,000 gallons.

Fuel oil demand also improved. Shipments increased more than 1,000,000 gallons, or 4.3 per cent, to 28,054,000 gallons. The chief increases were reported by Oklahoma and Kansas operators. As a result of heavier crude runs the production of fuel oil was increased 3,700,000 gallons to 28,641,000 gallons. This increase caused an addition of about 600,000 gallons to fuel oil stocks, which stood at 104,439,000 gallons Dec. 9.

Every group in the field except north Louisiana and Arkansas reported larger crude runs. Kansas refiners increased runs less than 200 barrels daily average, or 0.3 per cent, to 55,727 barrels a day. Oklahoma refiners increased runs a little more than 7,000 barrels daily average, or 7.1 per cent, to 107,608 barrels a day. North and central Texas refiners increased their runs nearly 9,000 barrels daily average, or 14.3 per cent, to 69,418 barrels a day. The decrease in north Louisiana and Arkansas crude runs amounted to only 800 barrels daily average. In the whole field crude runs were increased 15,100 barrels daily average,

Current Prices of Principal Mid-Continent Refined Products


Cents Per Gallon
Cents Per Gallon
58-60-437 E.P. U.S. Motor Gasoline
41-43 W.W. Kerosene
38-40 Straw Distillate
32-36 Gas Oil
24-26 Fuel Oil
Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

Prices shown are on Group 3 basis and extended to date shown in Refinery Market Tables in Market Section of this Issue

or 5.9 per cent, to 271,982 barrels a day.

The cold wave cut gasoline shipments from reporting plants 2,367,000 gallons, or 6.8 per cent, to 32,652,000 gallons. The cold affected Oklahoma and Texas refiners less seriously than other groups on account of the large volume of export business on which refiners in these states are working. Gasoline production at all reporting plants was increased 1.7 per cent to 34,915,000 gallons. Stocks were increased 2,260,000 gallons to 68,271,000 gallons.

Scouts Association Meets

TULSA, Dec. 8.—Board of directors of the Mid-Continent Oil Scouts Association held its quarterly meeting at the Mayo hotel Dec. 3. The association has reorganized, and has adopted a new constitution and by-laws. The annual convention will be held early in May, place to be announced later. Membership in this body consists of those actively engaged in scouting, land or lease work who are employed by an officially recognized oil or gas company.

Osages Are $2,267,750 Richer By Dec. 12th Lease Sale

Staff Special—By Telegraph
TULSA, Dec. 13

WITH the aid of brisk bidding on tracts immediately east of the Burbank field, the sale of Osage reservation oil leases, Dec. 12, commanded the respectable figure of $2,267,750.

The high mark in the bidding was reached by the Lewis Gas Products Co. (George Parker and others) who paid $600,000 for the southwest quarter of section 2-26-6. This tract adjoins on the north a quarter section held by the same interests on which an extension to the Burbank field was effected within the past year.

Other imposing bids were the $465,000 paid by the Carter Oil Co. for the southeast of 3-26-6 which adjoins the Kewanee Oil & Gas Co. east extension to Burbank; the $405,000 paid by the Kewanee for the northeast of 28-27-6 and the $300,000 paid by the Prairie Oil & Gas Co. and A. G. Oliphant recently brought in a 5,000-barrel well, his two-thirds interest later being bought by the Prairie. Now the buyer and the seller propose to join forces in extending the strike farther east. The northeast diagonal offset tract to the one on which the big well was drilled was also bought by Prairie and Oliphant, but brought only $4,200, its prospective value having been greatly decreased by a dry hole drilled a week before the sale by the Phillips Petroleum Co. on the tract next west.

Of the 125 tracts offered for sale only 7 were passed. The acceptance of a hundred dollar minimum bid instead of the customary $300 and the special dispensation allowing five years in which to start a well made practically everything that was offered worth buying at some price. Most of the usual crowd of Osage sale bidders were on hand, these including the Prairie, Gypsy, Carter, Phillips, Texas, Empire, Comar, Peters Petroleum and Producers and Refiners Corp.

Fifty-three tracts west of range 8 brought a total of $2,211,500, while 65 tracts east of range 8 brought a total of $56,150.

Prices for Car Capacity Charts

THE "Passenger Car Capacity Chart" published Dec. 7 in connection with an article entitled "Increasing Oil, Grease, Gasoline and Alcohol Sales with Charts," has had a wide and heavy demand following announcement that these charts would be available to marketers at a small cost. NATIONAL PETROLEUM NEWS offers the charts at these prices, printed on 4-ply white cardboard, 9 by 19 inches in size, including the Chart of Alcohol Solutions:

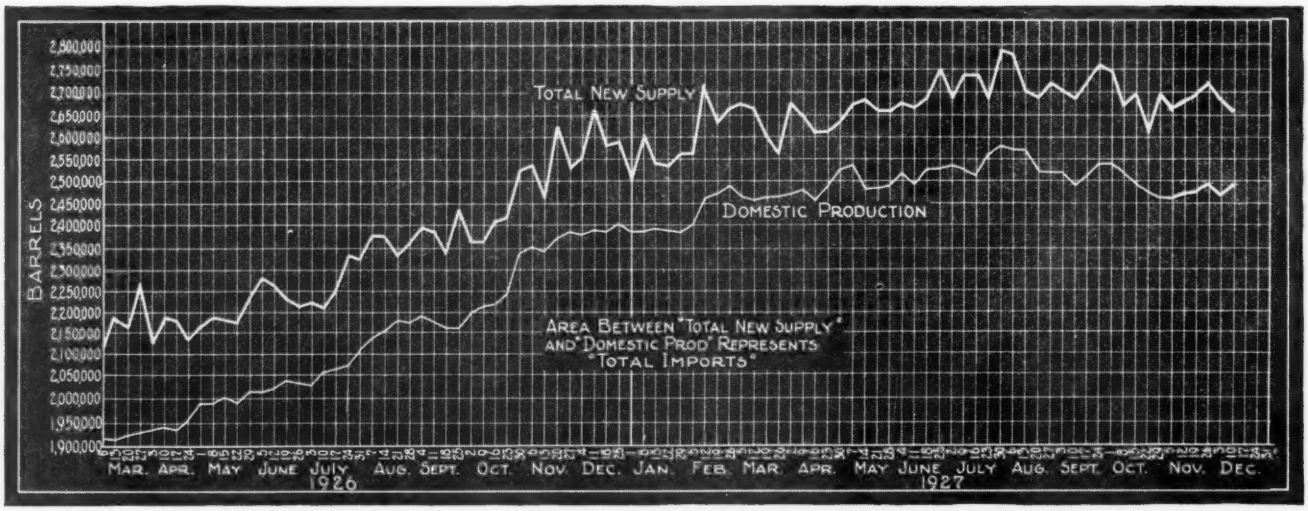
1 to 10 copies, 15 cents each.
Lots of 10, from 20 to and including 50 copies, 12 cents each.
Lots of 10, from 60 to and including 100 copies, 10 cents each.
Lots of 50, from 150 to and including 500 copies, 8 cents each.
Lots of 100, from 600 to 1,000 copies, 7 cents each.
For lots larger than 1,000 copies, write for special prices.

All orders will be mailed or expressed prepaid anywhere in the United States when remittance is attached.

Correction

On page 87, of this current issue, in the cutline to Plate 2 in the article by Mr. Reid on the care of gas engines, due to a typographical error, the line as printed reads "interbearings". It should be "outerbearings".

Daily Average Crude Oil Production and Imports



Daily average gross output of United States, by fields, for week ending with dates below as compiled by American Petroleum Institute

PRODUCTION SUMMARY

	Dec. 10	Dec. 3
Production east of Rockies	1,860,100	1,854,350
Increase		5,750
Total production in U. S.	2,487,500	2,480,750
Increase		6,750
Crude oil imports	167,286	218,571
Decrease		51,285
Total crude supply	2,654,786	2,699,321
Decrease		44,535

OKLAHOMA

	Dec. 10	Dec. 3
North Braman	2,950	2,950
South Braman	2,050	2,100
Blackwell	3,900	3,900
Hubbard	2,850	2,900
Thomas	2,000	2,050
Tonkawa	16,350	16,450
Garber	9,850	9,950
Burbank	37,400	37,250
Osage, outside Burbank	30,050	30,050
Watchorn	1,500	1,600
Cushing	21,000	21,000
Yale Jennings	9,400	9,500
Davenport	2,550	2,600
Bristow-Slick	24,850	24,850
North Okmulgee	16,100	16,150
Lyons-Deaner	6,250	6,300
Stroud	1,250	1,250
Cromwell	10,800	10,850
Papoose	5,750	5,850
Wewoka	10,200	10,350
Seminole	55,750	58,450
Bowlegs	118,150	123,700
Searight	23,450	25,300
Little River	38,900	39,650
Earlsboro	159,300	177,100
Duncan district	6,750	6,800
Graham	6,450	6,450
Fox	1,900	1,950
Healdton	14,600	14,700
Hewitt	9,300	9,350
Scholem Alecham	12,300	12,500
Others	72,300	72,150
Total Oklahoma	736,200	766,000
Decrease		29,800

KANSAS

	Dec. 10	Dec. 3
Greenwood County	31,300	31,800
Florence-Covert	1,500	1,500
Peabody-Elbing	3,850	3,900
Elodarod-Towanda	14,250	14,250
August-Fox-Bush	4,200	4,250
Rainbow Bend	2,200	2,200
Russell	2,250	2,400
Churchill	14,000	13,700
Others	32,500	32,300
Total, Kansas	106,050	106,300
Decrease		250

NORTH LOUISIANA

	Dec. 10	Dec. 3
Homer	4,600	4,650
Haynesville	6,800	6,950
Caddo, light	12,050	11,950
Caddo, heavy	4,100	4,050
De Soto, Red River	4,100	4,100
Elm Grove	700	600
Bellevue	1,050	1,050
Cotton Valley	5,000	5,050
Urania	8,500	9,000
Pleasant Hill	750	600
Total, North Louisiana	57,650	48,000
Decrease		350

ARKANSAS

	Dec. 10	Dec. 3
El Dorado	6,100	6,100
Smackover, light	9,300	9,450
Smackover, heavy	73,350	73,650
Stephens	1,150	1,200
Nevada	3,450	3,450
Lisbon	2,650	2,700
Others	100	100
Total Arkansas	96,100	96,650
Decrease		550

TEXAS (Outside Gulf Coast)

Panhandle District

	Dec. 10	Dec. 3
Hutchinson County	57,800	57,900
Carson County	8,100	8,150
Gray County	19,300	17,900
Wheeler County	1,250	1,400
Others	50	200
Total, Panhandle District	86,500	85,550
Increase		950

North Texas

	Dec. 10	Dec. 3
Burkburnett	12,000	12,250
Electra	11,950	12,050
Iowa Park and K-M-A	1,900	2,000
Wilbarger	11,400	11,650
Archer County	23,500	23,900
Montague-Cooke	15,750	15,900
Others	700	700
Total, North Tex.	77,200	78,450
Decrease		1,250

West Central Texas

	Dec. 10	Dec. 3
Stephens County	7,900	7,850
Eastland-Desdemona	8,650	8,100
Brown County	18,000	18,850
Coleman County	1,150	1,350
Callahan County	4,150	4,200
Shackelford County	5,300	5,450
Young County	9,750	9,500
Throckmorton County	1,300	1,400
Palo Pinto County	450	500
Others	1,450	1,300
Total, W. Central Texas	58,100	58,500
Decrease		400

West Texas

	Dec. 10	Dec. 3
Jones County	1,500	1,750
Mitchell and Scurry Counties	3,500	3,350
Howard County	6,250	4,400
Reagan County	22,950	23,600
Crane and Upton Counties	127,700	112,100
Crockett County	2,700	2,850
Pecos County	54,200	43,100
Winkler	50,500	37,300
Others	2,500	2,700
Total, W. Texas	271,800	231,150
Increase		40,650

East Central Texas

	Dec. 10	Dec. 3
Mexia	8,300	8,350
Currie	550	600
Richland	700	650
Wortham	2,400	2,400
Corsicana-Powell	13,300	13,400
Nigger Creek	2,050	2,150
Total, East Central Texas	27,300	27,550
Decrease		250

Southwest Texas

	Dec. 10	Dec. 3
Luling	14,500	14,850
Lytton Springs	1,600	1,600
Somerset	850	850
Laredo District	7,850	8,000
Piedras Pintas		
Dale	400	400
Others	400	400
Total, Southwest Texas	25,600	26,100
Decrease		500
Increase		39,200
Total, Texas—(Outside Gulf Coast)	546,500	507,300

GULF COAST

Coastal Texas

	Dec. 10	Dec. 3
West Columbia	8,500	8,750
Damon Mound	900	850
Big Creek	2,500	2,750
Boling	2,550	2,200
Blue Ridge	4,000	4,550
Pierce Junction	13,400	13,200
Humble	1,800	1,850
Goose Creek	7,800	7,650
South Liberty	2,300	2,300
Hull	13,950	14,150
Saratoga	1,050	1,000
Batson	1,250	1,250
Sour Lake	3,900	3,950
Spindletop	55,050	49,500
Orange County	3,900	3,850
Others	3,700	3,900
Total, Coastal Texas	126,550	121,700
Increase		4,850

Coastal Louisiana

	Dec. 10	Dec. 3
Vinton	4,800	4,600
Lockport	5,250	5,750
Evangeline	1,200	1,200
Edgerly	2,100	2,150
Others	1,250	1,400
Total, Coastal Louisiana	14,600	15,100
Decrease		500
Total Gulf Coast	141,150	136,800
Increase		4,350

ROCKY MOUNTAIN

Wyoming

	Dec. 10	Dec. 3
Salt Creek	36,300	41,250
Grass Creek	2,350	2,550
Elk Basin	1,000	1,050
Big Muddy	2,800	2,800
Lost Solider	2,550	2,650
Rock River	2,700	2,600
Lance Creek	1,100	1,050
Teapot Dome		
Others	3,500	3,500
Total, Wyoming	52,300	57,450
Decrease		5,150

Montana

	Dec. 10	Dec. 3
Cat Creek	1,900	1,900
Sunburst	11,000	11,000
Others	150	150
Total, Montana	13,050	13,050

Colorado

	Dec. 10	Dec. 3
Moffat (Craig)	1,200	1,300
Fort Collins	2,650	2,850
Florence	1,050	750
Others	1,950	1,550
Total, Colorado	6,850	6,450
Increase		400

New Mexico

	Dec. 10	Dec. 3
Table Mesa	100	100
Artesia	1,400	1,300
Hogback	600	600
Rattlesnake	50	500
Others	100	100
Total N. Mexico	2,250	2,600
Decrease		350
Total, Rocky Mountain	74,450	79,550
Decrease		5,100

California

	Dec. 10	Dec. 3
Santa Fe Springs	38,500	38,500
Long Beach	112,000	108,500
Huntington Beach	62,000	61,500
Torrance	20,000	20,000
Dominguez	14,500	14,500
Rosecrans	9,000	9,800
Inglewood	32,000	32,000
Midway-Sunset	81,000	82,500
Ventura Avenue	51,905	53,100
Seal Beach	46,000	46,000
Others	160,500	160,000
Total California	627,400	626,400
Increase		1,000

Eastern

	Dec. 10	Dec. 3
(Including Ill., Ind., Ky., O., W. Va., Pa., and N. Y.)	112,000	113,750
Decrease		1,750

Weather is Influence, but Seminole Field Was Again on Heavy Decline

By J. C. Chatfield
N. P. N. STAFF WRITER

TULSA, Dec. 10

EVENTS of the past week in the Seminole district will enable confirmed optimists to point with pride, and cause pessimists to view with alarm. The long awaited definite decline in Seminole production finally became apparent with the kind aid of two days of near zero weather. But the wildcatter produced more or less conclusive evidence that 1928 will have its Seminole problem as well as 1927.

On Dec. 2 the 1,022 wells in the Seminole district produced 419,660 barrels of oil, an average of 411 barrels per well. On Dec. 7, just before the cold wave hit, production was down to 401,270 barrels from 1,034 wells, an average of 388 barrels per well. The natural decline in five days was thus 18,000 barrels for the field, or 23 barrels per well.

With the cold wave, gas volumes declined, moisture in the gas lift lines froze, some water lines were out of commission, oil moved slower and during the 24 hours ending at 7 a.m., Dec. 8, production fell off 19,340 barrels to 380,930 barrels. The next morning's gauge showed a further drop of 2,326 barrels to 378,604 barrels from 1,041 wells, an average of 364 barrels per well. The total decline for the week was thus 41,056 barrels or 47 barrels per well.

Optimists who have placed wagers during the past few months that Seminole production would be down to 300,000 barrels or some such figure by Jan. 1 may well be close students of the weather forecasts during the holidays. Another cold wave might be requested of Santa Claus and a few bets collected.

Having briefly disposed of the optimists it is a duty to say that Messrs. Snowden and McSweeney and the Barnsdall Oil Co. have provided sufficient additional data to indicate that townships 7-6 and 8-5 must be given respectful attention in any forecast of greater Seminole production for 1928. Each of the two organizations has added one well to the respectably long list of potential Seminole pools which seemingly await only abrogation of the present shut-down agreement to act as centers of active drilling. The mood of the operators is such, however, that it may be some months before any such campaigns start.

Barnsdall's wildcat in the NE NW of 14-8-5 furnished the biggest news of the week when it topped the Wilcox sand at 4291 feet and started flowing steadily. This well is about four miles west of Bowlegs in the next township. It is 2½ miles west and a half mile south of the Gypsy Oil Co's. No. 1 Dosar in 7-8-6.

The new Barnsdall producer was drilled 5 feet into the Wilcox to a total depth of 4296 feet. In the first hour the well made 106 barrels and in the first 18 hours put 1150 barrels in the tanks. The oil is 41 gravity.

As in many other parts of the Seminole district the gas pressure is not great in the Barnsdall well. Where there is a good body of oil in the sand without water these wells produce large quantities of oil under artificial gas or air pressure stimulus.

ON THE same day Barnsdall brought in this wildcat the Gypsy's Dosar, which had been pinched in to 100 barrels per day, quit flowing. The company will clean out the hole to bring the well back on production. In another area cessation of flowing of such a well would lead to much head-shaking, but in Seminole this is not considered important.

The Snowden and McSweeney wildcat in the NWc of 13-7-6 is one foot in the Wilcox sand at 4315 feet. This well came in on Dec. 6 with a production of 40 barrels per hour. Nothing more has been done and the well now is producing about 300 barrels per day. This well is a mile north and a mile east of the Independent Oil & Gas Co's. shut in well in 23-7-6.

About three-quarters of a mile on the other side of the Independent's shut in producer the Barnsdall Oil Co. in 22-7-6 has been shut down at 4149 feet for several months in the Viola lime topped at 4140 feet. This has been figured as an almost certain producer since the Independent well came in and now Snowden and McSweeney have proved their property Barnsdall has decided to do likewise. The hole has been bailed out and the well is now drilling ahead at 4162 feet with the Wilcox expected in another 50 feet or so. Like other wildcats in the Seminole district this will be drilled only one foot in the Wilcox and pinched in.

THE MID-CONTINENT PETROLEUM CORP. in the NE SE NW of 27-7-6, another three-quarters of a mile southwest, has resumed drilling operations after

WILL the subscriber who mailed to the Graver Corp., East Chicago, a coupon taken from its advertisement in NATIONAL PETROLEUM NEWS, asking for information on installing 5 tanks with 60,000 gallons capacity please get in touch with the Graver Corporation at once. They are unable to answer your query because you failed to sign your name and address to the coupon.

Drilling Operations in Oklahoma, Kansas and Texas, Week Ended December 10, 1927

	December 10 — Week Ended — December 3									
	Loc.	Rigs	Drg.	S.D.	Total	Loc.	Rigs	Drg.	S.D.	Total
OKLAHOMA										
Burbank	3	3	19	4	29	2	10	13	5	30
Other Osage	6	6	22	1	35	4	9	20	2	35
Bristow-Cushing	7	5	30	6	48	5	4	33	6	48
North Oklahoma	13	7	76	37	133	13	9	70	33	125
South Oklahoma	5	21	120	30	176	1	18	128	18	165
Muskogee	..	12	38	22	72	..	10	34	24	68
Okmulgee-Bristow	7	33	64	21	125	7	36	62	17	122
Tonkawa	1	2	4	1	8	1	2	6	9	18
Seminole Dist	15	25	218	19	277	17	31	230	19	297
Total Oklahoma	57	114	591	141	903	50	129	596	133	908
KANSAS	28	53	104	67	252	28	53	104	67	252
TEXAS										
Central	..	117	199	122	438	..	132	206	128	466
Panhandle	..	94	87	85	266	..	93	83	89	265
N. Central	..	39	99	24	162	..	59	95	28	182
West	..	119	198	119	436	..	124	195	129	448
Laredo	..	1	25	19	45	..	1	25	19	45
Total Texas	..	370	608	369	1,347	..	409	604	393	1,406
GRAND TOTAL	85	539	1,350	604	2,548	78	591	1,304	593	2,566

Seminole District Production by Companies and Leases, December 9 and December 2, 1927

Company	Farm	S.T.R.	Dec. 9th No. Wells	Dec. 9th Prod.	Dec. 2nd No. Wells	Dec. 2nd Prod.
BOWLEGS						
Amerada	Rascoe	15- 8-6	8	3,690	8	3,680
Atlantic	Baker	1- 8-6	4	844	4	1,010
Atlantic	Fleet	23- 8-6	4	850	4	789
Atlantic	Grayson	12- 8-6	2	1,600	2	1,979
Atlantic	A. Jones	10- 8-6	3	140	3	150
Atlantic	C. Jones	9- 8-6	2	474	2	107
Total Atlantic			15	3,908	15	3,928
Barnsdall	McNac	28- 8-6	1	35	1	37
Barnsdall	Murrow	11- 8-6	4	1,154	4	1,035
Total Barnsdall			5	1,189	5	1,072
Carter	Bowlegs	15- 8-6	3	1,380	3	1,350
Carter	Burden	23- 8-6	3	675	3	650
Carter	Harjoche	15- 8-6	6	845	6	745
Carter	Jones	11- 8-6	3	3,270	3	3,885
Carter	Hilly	23- 8-6	2	930	2	1,075
Carter	Walker	15- 8-6	2	615	2	680
Carter	Melisse	9- 8-6	1	1,800	1	2,105
Carter	Wise	23- 8-6	12	8,270	12	8,430
Total Carter			32	17,800	32	18,920
Empire	Lacey	15- 8-6	6	653	6	863
Empire	Wise	23- 8-6	2	1,162	2	1,215
Total Empire			8	1,815	8	2,078
Gypsy	Bowlegs	22- 8-6	1	335	1	330
Gypsy	Bradley	9- 8-6	1	52	1	65
Gypsy	Brown	33- 8-6	1	52	1	52
Gypsy	Cumsey	8- 8-6	4	2,397	4	1,917
Gypsy	Dosar	7- 8-6	1	0	1	100
Gypsy	Grayson	13- 8-6	4	2,167	4	2,367
Gypsy	Harjoche		1	260	0	0
Gypsy	Jones	11- 8-6	1	0	1	482
Gypsy	Walker	15- 8-6	8	2,765	8	2,127
Gypsy	Wise	23- 8-6	3	55	3	207
Total Gypsy			25	8,083	25	7,647
I. T. I. O.	Barnett	24- 8-6	2	624	2	667
I. T. I. O.	Billington	22- 8-6	5	689	5	963
I. T. I. O.	Bowlegs	22- 8-6	11	1,267	11	1,439
I. T. I. O.	Davis	13- 8-6	4	2,346	4	2,330
I. T. I. O.	Fay	18- 8-6	6	4,933	6	5,787
I. T. I. O.	Goforth	15- 8-6	11	1,808	11	2,029
I. T. I. O.	Hull	26- 8-6	1	0	1	178
I. T. I. O.	Livingston	15- 8-6	11	5,114	11	5,382
I. T. I. O.	Lizzie	11- 8-6	2	973	2	1,020
I. T. I. O.	Walker	15- 8-6	8	1,103	8	1,607
I. T. I. O.	Wilmont	15- 8-6	4	1,029	4	1,638
I. T. I. O.	Youngblood	22- 8-6	2	11	2	16
Total I. T. I. O.			67	19,897	67	23,104
McCulloch	Bowlegs	22- 8-6	3	285	3	240
Magnolia B.F.	Davis	13- 8-6	1	644	1	933
Magnolia	Rhodes	10- 8-6	2	1,027	1	364
Magnolia	M-Davis	13- 8-6	1	644	1	672
Magnolia	Hammond	10- 8-6	2	0	2	31
Magnolia	Van Buskirk	9- 8-6	1	416	0	0
Total Magnolia			7	2,731	5	2,000
Mid-Continent	Bowlegs	22- 8-6	1	150	1	220
Mid-Continent	Baker	10- 8-6	4	2,372	4	2,238
Mid-Continent	Hutke		1	0	1	5
Mid-Continent	Smith	12- 8-6	4	935	4	780
Total Mid-Continent			10	2,457	10	3,243
Minnehoma	Bowlegs	15- 8-6	3	157	3	270
Prairie	Gahagan	23- 8-6	4	1,128	4	1,480
Prairie	Harber	10- 8-6	4	3,625	7	4,005
Prairie	Jones	11- 8-6	2	1,890	2	2,245
Prairie	Templeton	12- 8-6	4	4,305	4	5,380
Prairie	Whitney	23- 8-6	4	170	4	145
Total Prairie			21	11,118	21	13,255
Pure	Reed	14- 8-6	15	5,440	15	5,998
Pure	D. Strother	14- 8-6	3	1,154	3	1,028
Pure	F. Strother	10- 8-6	2	1,197	2	1,105
Total Pure			20	7,796	20	8,136
Roxana et al	Taylor	16- 8-6	6	1,641	6	1,686
Shaffer	Lacey	14- 8-6	3	712	3	710
Sinclair	Bowlegs	22- 8-6	1	95	1	100
Sinclair	Cumsey	10- 8-6	2	4,495	2	4,910
Sinclair	Ellen	11- 8-6	6	3,120	6	2,780
Sinclair	Harjo	14- 8-6	3	1,295	3	1,235
Sinclair	Jones	8- 8-6	6	5,461	6	5,770
Sinclair	Taylor	10- 8-6	4	4,566	4	4,827
Sinclair	Walker	22- 8-6	4	1,240	4	1,345
Total Sinclair			26	20,282	26	20,967
Texas	Reed	14- 8-6	9	5,545	9	6,300
Tidal	Grayson	13- 8-6	3	1,215	3	1,540
Tidal	Harjoche	10- 8-6	6	2,315	6	2,746
Total Tidal			9	3,530	9	4,286
Twin State	Jones	10- 8-6	2	60	2	75
Total Bowlegs			287	113,694	283	121,704
LITTLE RIVER						
Amerada	Fore	35- 8-6	1	675	1	400
Amerada	Nitey	35- 8-5	4	3,030	4	3,025
Total Amerada			5	3,705	5	3,425
Blackwell	Nitey	35- 8-6	8	5,127	8	4,767
Carter	Fish	1- 7-6	3	1,590	1	750
Continental	Cozar	2- 7-6	2	790	2	1,290
Gypsy	Campbell	36- 8-6	2	0	2	792
Gypsy	Nungee	1- 8-6	1	60	1	90
Gypsy	Pottey	35- 8-6	2	977	2	1,437
Gypsy	Wadsworth	1- 7-6	1	15	1	30
Total Gypsy			6	1,052	6	2,349
Independent	Harris	23- 7-6	1	108	1	108
I. T. I. O.	Campbell		1	231	1	252
I. T. I. O.	Dungan	35- 8-6	3	3,664	3	3,893
I. T. I. O. MA	House	1- 7-6	1	746	1	895
I. T. I. O. WE	House-A	1- 7-6	1	70	1	65
I. T. I. O. WE	House-B	2- 7-6	3	2,324	3	2,717
I. T. I. O.	Jackson	1- 7-6	3	2,953	3	3,138
I. T. I. O.	McCulla	1- 7-6	3	1,248	3	1,070
I. T. I. O.	Nitey	2- 7-6	6	2,565	6	2,437
I. T. I. O.	Phoebe-A	36- 8-6	2	812	2	821
I. T. I. O.	Phoebe-B	36- 8-6	3	1,371	3	1,340
I. T. I. O.	Reed	1- 7-6	1	231	1	256
I. T. I. O.	Soketneche	1- 7-6	4	1,554	4	1,488
Total I. T. I. O.			31	17,769	31	18,372
Mid-Continent	Wadsworth	26- 8-6	7	1,595	7	1,915
Mid-Continent	Smith		1	40	1	45
Total Mid-Continent			8	1,635	8	1,960
Philmack	Davis	1- 7-6	1	1,340	1	1,180
P & R	House	2- 7-6	4	2,360	4	2,970
Roxana	Smith	1- 7-6	1	52	1	21
Sinclair	Cosan		1	60	0	0
Superior	Wadsworth	1- 7-6	1	21	1	31
Snowden-McSweeney	Tiger		1	338	0	0
Texas	Coker	1- 7-6	3	835	3	685
Tidal	House	1- 7-6	3	2,040	2	1,402
Tidal	Johnson	1- 7-6	1	72	1	75
Total Tidal			4	2,112	3	1,477
TOTAL LITTLE RIVER			81	38,894	76	39,385
EARLSBORO						
Amerada	Anderson	15- 8-6	3	45	3	1,910
Amerada	Cowden	4- 9-5	8	2,300	8	2,255
Amerada	Rodgers	3- 9-5	3	800	2	3,280
Total Amerada			14	3,145	13	7,445
Barnsdall	Brown	10- 9-5	4	3,056	4	4,315
Barnsdall	Bruner-F	2- 9-5	2	686	2	918
Barnsdall	Bruner-N	11- 9-5	4	3,177	4	3,593
Barnsdall	Cudjo	11- 9-5	1	29	1	27
Barnsdall	Davis-D	11- 9-5	3	2,936	3	3,793
Barnsdall	Davis-J	11- 9-5	4	2,803	3	3,190
Barnsdall	Davis-M	11- 9-5	3	3,087	3	290
Barnsdall	Gibson	9- 9-5	7	3,156	7	3,994
Barnsdall	Ingram	4- 9-5	7	6,417	7	8,551
Barnsdall	Pack	10- 9-5	4	208	4	198
Barnsdall	Peter	10- 9-5	4	242	4	381
Barnsdall	Sango	2- 9-5	2	767	2	993
Barnsdall	Sebolka	15- 9-5	1	946	1	1,507
Barnsdall	Sullivan-H	11- 9-5	2	213	2	265
Barnsdall	Sullivan	10- 9-5	3	71	3	80
Barnsdall	Watsutke	12- 9-5	4	1,156	4	1,057
Total Barnsdall			55	28,597	54	33,160
Carter	Davis	13- 9-5	1	1,165	1	1,280
Carter	Payne	12- 9-5	3	925	3	1,045
Carter	Sango	2- 9-5	3	7,460	3	8,020
Total Carter			7	9,540	7	10,345
Continental	Kays	2- 9-5	2	565	2	1,125
Continental	Spencer	12- 9-5	4	2,135	4	1,625
Total Continental			6	2,700	6	2,750
Crosbie	Bryant	9- 9-5	2	450	2	520
Empire	Barker	12- 9-5	1	2,575	1	3,240
Empire	Edmundson	3- 9-5	3	2,432	3	2,560
Total Empire			4	5,007	4	5,800
Gypsy	Bruner	10- 8-6	4	5,000	4	5,745
Gypsy	Carter	11- 8-6	10	6,960	10	6,615
Gypsy	Earl		1	40	0	0
Gypsy	Hunick	5- 9-5	1	430	1	430
Gypsy	Noble	12- 9-5	4	6,405	4	7,282
Gypsy	Peter	10- 9-5	6	197	6	717
Gypsy	State	16- 9-5	4	1,660	4	1,285
Gypsy	Sango	1-9 -5	4	11,307	4	9,172
Total Gypsy			34	31,999	33	31,246
Independent	Bruner	10- 9-5	4	205	4	980
Independent	Gaines	11- 9-5	2	3,070	2	5,455
Independent	Knappen	8- 8-5	5	3,549	5	4,061
Independent	O'Dell	4- 9-5	4	100	4	105
Independent	Sullivan	10- 9-5	4	35	4	33
Total Independent			19	6,959	19	10,634
Interocean	Payne	12- 9-5	1	20	1	20
Magnolia	Bryant	9- 9-5	6	2,238	6	2,449
Magnolia	Cowden	4- 9-5	4	53	4	101
Magnolia	Dixon		1	142	1	165
Magnolia	Edmundson	3- 9-5	3	194	2	937
Magnolia	Holmsley	11- 9-5	8	7,913	8	7,848
Magnolia	Ingram	10- 9-5	1	35	1	28
Magnolia	Lena	10- 9-5	3	84	3	117
Magnolia	Seay	12- 9-5	8	1,792	6	1,766
Magnolia	Simpson	10- 9-5	4	340	4	496
Magnolia	Sparks	11- 9-5	7	3,670	7	5,738
Magnolia	Sullivan	12- 9-5	3	1,026	3	1,325
Total Magnolia			48	17,488	45	20,970
Mid-Continent	McCumber	9- 9-5	7	1,635	7	2,135
Mid-Kansas	Anderson	14- 9-5	4	665	3	540
Phillips	Dunnaway	15- 9-5	1	30	1	30
Phillips	Graham	9- 9-5	7	350	7	402
Total Phillips			8	380	8	432

(*Continued on Page 43*)

Seminole District Production by Companies and Leases, December 9 and December 2, 1927

(Continued from Page 42)

Company	Farm	S.T.R.	Dec. 9th No. Wells	Dec. 9th Prod.	Dec. 2nd No. Wells	Dec. 2nd Prod.
Prairie	Baker	23- 9-5	1	30	1	50
Prairie	Davis	13- 9-5	4	1,320	4	1,785
Prairie	Graham-C	3- 9-5	2	525	2	840
Prairie	Graham-O	10- 9-5	4	2,920	4	3,875
Prairie	Stidham	11- 9-5	13	8,725	13	9,495
Total Prairie			24	13,520	24	16,045
Roxana	Bayliss	17- 9-5	1	17	1	19
Roxana	Spencer	12- 9-5	2	326	2	2,534
Total Roxana			3	343	3	2,553
Shaffer	Clark	1- 9-5	4	1,478	4	577
Sinclair	Foreman		1	15	1	15
Sinclair	Hollins	12- 9-5	3	642	3	905
Sinclair	Sango	2- 9-5	1	0	1	1,680
Total Sinclair			5	657	5	2,500
Skelly	Spencer	12- 9-5	2	2,003	2	2,220
Texas	Anderson	2- 9-5	6	1,250	5	1,625
Texas	Brown	10- 9-5	8	1,480	8	2,220
Texas	Rodgers	5- 9-5	3	6,270	3	6,295
Texas	Wilmont	10- 9-5	6	1,480	6	1,820
Total Texas			23	10,480	22	11,960
Tidal	Watkins	9- 9-5	6	2,170	5	2,790
Twin State	Baker	12- 9-5	4	135	4	270
Twin State	Hearn	2- 9-5	3	10,695	3	9,325
Total Twin State			7	10,830	7	9,595
Total Earlsboro			285	150,436	277	174,307
TOTAL LITTLE RIVER			81	38,894	76	39,385
TOTAL SEARIGHT			69	23,041	67	24,747
TOTAL BOWLEGS			287	113,694	283	121,704
TOTAL SEMINOLE			319	52,539	319	59,517
GRAND TOTAL SEMINOLE DISTRICT			1,041	378,604	1,022	419,660
Average per well				364		411

Completions in N.E. Central, West, Panhandle and North Texas, Week Ended December 10, 1927

NORTH AND EAST-CENTRAL TEXAS

Brown County

Company	Well Farm	Location Survey	Depth	Init. Prod.
Cranfill et al	18-Smith	SA&MG	1336-1351	50
Humble	9-Gilbraith	SA&MG	1292-1311	48
Advance	3-Hart	Ford	1484-1615	¾M
United Royalties	1-Barnes	Hawkensburg	1154-1283	1M
Mace	1-Mation	Victor	T.D. 300	Dry
Cranfill et al	1-DeBusk	Padillo	T.D. 1400	Dry
Ratblatt	2-Jones	T T R Co.	T.D. 1402	Dry
Van Bibber et al	3-Evans	Woodward	T.D. 706	Dry

Callahan County

Gibson et al	5-Neuman	Univ.	T.D. 865	Dry
Maddox	1-Cowan	Comal	342-366	5
Warren et al	2-Brandon	TE&L	420-428	5

Eastland County

Hoosier	6-Fox	McLennan	1611-1623	40
Latshow et al	1-Harbin	H&TC	1490-1515	50
Mook Texas	1-Casey	Norman	3013-3026	70&25M
Mooreman et al	1-Thorpe	S&P	T.D. 3830	Dry

Jack County

Buttram	4-Jones	SPRR	2012-2022	50

McCullouch County

Lanning Ball et al	1-Johnson	GH&H	T.D. 1001	Dry

Palo Pinto County

Upham	1-Warton	Green	4038-4238	3½M

Stephens County

Clark	2-Riddle	T&P	1825-1855	39

Shackleford County

Brodwell et al	2-McKelvay	T&P	T.D. 1387	Dry

Young County

Pitzer et al	2-Hinson	Pier	2198-2203	700

NORTH TEXAS

Archer County

Seaberry et al	1-Perkins	DCSL	647-657	6
Reeder et al	2-Farmer	N A R	1509-1511	36
Consolidated et al	6-Netherton	ATNC	T.D. 1564	Dry
Murchison	2-Turbeville	JCSL	T.D. 1115	Dry
Foster et al	1-Ball	Nunley	T.D. 600	Dry
Consolidated et al	1-Roach Co.	McCravey	T.D. 1126	Dry

Cooke County

Murchison	1-Harris	SPRR	T.D. 1799	Dry
Hedrick Camp	1-Fleitman	M T	1365-1385	35

King County

Midwest	1-Rector		T.D. 3507	Dry

Montague County

Bridwell et al	3-Salmon	Robertson	T.D. 1907	Dry

Wichita County

The Texas	339-Waggoner	Bradley	T.D. 2250	Dry
Dale	1-Kemp	FWVFL	T.D. 1460	Dry

Young County

Continental	1-Eichelberger	TE&L	T.D. 1001	Dry

PANHANDLE

Carson County

Empire	8-Burnett	I&GN	2385-2535	35M

Gray County

Osborne et al	1-Holmes	I&GN	T.D. 3385	25

Hutchinson County

Gordon et al	1-Sanford	H&TC	2994-3009	82
Phillips	1-Land	H&TC	2967-2970	572
Lenix et al	2-Smith	M&C	T.D. 3170	Dry
Great Plains	1-Bivins	TTRR	T.D. 3190	75M
RJW	1-Cockrell	D&SE	2934-3060	210
Roxana	2-Cockrell		2955-3045	50
Texas	1-Cockrell	M&C	T.D. 4512	Dry
Texas	2-Lewis	BS&F	T.D. 3020	10

WEST TEXAS

Crane County

Independent	3-Univ.	Univ.	2815-2912	300
Simms & Atlantic	10-Univ.	Univ.	2845-2940	2370
Gulf Prod.	44-McElroy	CCSD&RGNG	2728-2859	27

Pecos County

Kirby & Edson	1-Tippett	Sec. 108	1293-1465	800
Humble	2-Smith	TC	1315-1451	160
Marland & McMann	10-Yates	TC	1360-1510	150
Humble	3-Smith	TC	1365-1480	355
California	7-Yates	GC&SF	1182-1205	1524
Mid-Kansas&Trans.	5-Yates	I&GN	1038-1130	330
Mid-Kansas&Trans.	1-Yates	I&GN	1058-1330	2185
Mid-Kansas&Trans.	1-Yates	I&GN	1055-1066	290

Upton County

Champlin	2-Lane	GC&SF	1997-2028	680

Winkler County

Southern Crude	67-Hendricks	PSL	2955-3025	1975
Southern Crude	89-Hendricks	PSL	2671-2687	60

Howard County

Marland	1-Edith Fisher	T & P	T.D. 3870	Dry

Nolan County

A. G. Maloney	1-McElmurray	T & P		Abd.

Completions in North Louisiana and Arkansas, Week Ended December 10, 1927

Louisiana—Webster Parish

Company	Well	Location	Depth	Yield
Magnolia Pet. Co.	Haynesville Merc. Co. No. 1	1-22-10	2614	8M gas

Bossier Parish—Carterville

Bahan & Davis	Dodson No. 1	15-23-12	3103	25 bbls. oil 5M gas

Caddo Parish—Pine Island

Double H Oil Co.	Wadkins & Lane No. 8	27-21-15	1665	15 bbls.
Standard Oil Co. of La.	Stiles No. 190	27-21-16	1948	salt water abn.

Caddo Parish—Waskom

Ferguson et al	Z. Abney No. 1	7-17-16	952	4M gas

Caddo Parish—LaHoward

Woodley Pet. Co.	Knight B-4	2-15-12	2463	2M gas

Bossier Parish—Elm Grove

J. S. McCullough, Tr.	Hodges No. 4	25-16-12	1568	50 bbls.

Sabine Parish—Pleasant Hill

Arkansas Fuel Oil Co.	Logan No. 11	33-10-12	3314	200 bbls
Magnolia Pet. Co.	Logan No. 1	17-10-12	3265	25 bbls.

Ouachita Parish

Company	Well	Location	Depth	Yield
Jordan Drilling Co.	Miller No. 1	18-18-5E	2242	5M gas

Richland Parish

Moody & Seagraves	McCoy No. 2	30-16-6E	2406	75M gas

Urania—LaSalle Parish

Zoder et al	Urania No. 6	7-10-2E	1516	50 bbls.

Waskom—Harrison County, Texas

Tylong O. & G. Co.	Vaughan No. 2	W. R. Anderson HRS	1899	5M gas

Panola County

Magnolia Pet. Co.	John Jernigan No. 1	Jane Thorpe HRS	1010	4M gas

Arkansas—Stephens

Brewer et al	H. L. Curry No. 1	32-15-19	2201	15 bbls.

Smackover

H. R. Keever	Ezzell No. 4	12-17-15	2160	35 bbls.
Standard Oil of La.	Hardy-Murphy No. 24	4-16-15	2610	5M gas

Completions in Oklahoma and Kansas, Week Ended December 10, 1927

OKLAHOMA

Beckham County

Company	Well No.	Location	Depth	Init. Prod.
Wright et al	1	NWc Se SE 30-9-23 W	T.D. 3260	Dry

Caddo County

Company	Well No.	Location	Depth	Init. Prod.
Moran et al	1	NEc SE NW 5-5-9 W	1825-1846	80

Cleveland County

Company	Well No.	Location	Depth	Init. Prod.
Mid-Continent	1	SWc NW 20-8-1 E	T.D. 4725	Dry

Creek County

Company	Well No.	Location	Depth	Init. Prod.
Buckles	1	SWc SE NE 22-18-8 E	T.D. 1330	Dry
Olean	5	SWc NE NE 30-14-8 E	T.D. 4140	Dry
Henry et al	2	SEc SW SE 1-17-10 E	T.D. 2903	Dry
Texas	1	Sec NE 2-16-11 E	T.D. 2705	Dry
Gibson et al	2	NEc SW NW SW 17-17-7 E	2768-2780	308
Peters	4	NWc SE NE 21-16-8 E	3154-3157 OWD	140
Pontiac	10	NWc SW 13-17-10 E	1893-1933	70
Pontiac	1	SEc NE 14-17-10 E	1893-1938	75
Independent	6	SEc NW NE 18-14-10 E	445-458	1M

Garfield County

Company	Well No.	Location	Depth	Init. Prod.
Amerada	1	SWc NE 19-23-3 W	5568-5576	60
Chappel et al	4	C SW SE 14-22-4 W	T.D. 2420	Dry
Eason et al	1	CEL NE NW 26-22-4 W	T.D. 2395	Dry

Grady County

Company	Well No.	Location	Depth	Init. Prod.
Graham	1	CNL NW NW 17-5-7 W	T.D. 3201	Dry
Rockstool et al	1	C NW SE 3-4-8 W	T.D. 3365	Dry
Meridian	1	C SE NE 10-4-8 W	T.D. 2467	Dry
Marland	3	NWc SW 16-3-5 W	T.D. 3150	Dry
Okla. Gas Utilities	2	SWc SE SE 23-5-8 W	2070-2404	20M
Nichols	1	NEc SE NE 34-5-8 W	2478-2488	15
Okla. Gas Utilities	2	NEc SW NW 35-5-8 W	2129-2400	35M

Hughes County

Company	Well No.	Location	Depth	Init. Prod.
Prairie	3	NWc NW NW 20-8-10 E	T.D. 4148	Dry

Kay County

Company	Well No.	Location	Depth	Init. Prod.
Blackwell	1	C SE SW 25-28-1 W	T.D. 1665	Dry
Carter	3	SEc NE 17-27-1 W	T.D. 3655 OWD	Dry
Carter et al	5	C NW SW 17-29-1 E	1412-1473	21.2M
Greer et al	2	CEL W½ NE NE 30-28-1 E	1040-1070	45½
Greer et al	1	C NW NE 31-28-1 E	1040-1147	.2M

Logan County

Company	Well No.	Location	Depth	Init. Prod.
T. P. C.	1	SEc NW 33-18-4 W	4134-4144	10&4M

Muskogee County

Company	Well No.	Location	Depth	Init. Prod.
Gilbertson et al	4	CWL SW NW 27-14-16 E	1610-1637	50
Dixon et al	4	CNL SW NW NW 12-14-18 E	T.D. 1033	Dry

Noble County

Company	Well No.	Location	Depth	Init. Prod.
Magnolia	1	NWc SE 15-21-2 W	4461-4480	20

Okfuskee County

Company	Well No.	Location	Depth	Init. Prod.
Independent	1	CWL NW NE 30-11-11 E	T.D. 3777	Dry

Okmulgee County

Company	Well No.	Location	Depth	Init. Prod.
Cline	1	NWc SW NW 20-15-14 E	T.D. 2330	Dry
Powell	4	CSL NE SE 23-14-14 E	T.D. 1952	Dry

Osage County

Company	Well No.	Location	Depth	Init. Prod.
LeFever	14	SEc SW NW 1-29-10 E	T.D. 1640	Dry
Kewanee	9	SEc NE NW 34-27-6 E	2835-2895	110
Parker	2	NWc 11-26-6 E	2817-2865	430&11M
I. T. I. O.	383	NEc Se SE 35-26-11 E	1577-1603	4½M
Tselos	3	NWc SW NE 11-24-11 E	1670-1748	15

Pawnee County

Company	Well No.	Location	Depth	Init. Prod.
Superior	1	SEc NW NE 20-21-7 E	T.D. 3228 OWD	Dry

Pontotoc County

Company	Well No.	Location	Depth	Init. Prod.
American	1	NEc SE SW 27-5-6 E	1865-1897	5&5M
Homa Okla.	3	SWc SE NW 17-5-8 E	2336-2365	30M
Homa Okla.	4	NWc SE SE 17-5-8 E	2498-2543	70
Homa Okla.	2	SEc NE SW 33-5-8 E	T.D. 1560 OWD	Dry

Pottawatomie County

Company	Well No.	Location	Depth	Init. Prod.
McCulloch	1	NEc SW 2-9-2 E	T.D. 5134	Dry
Pine	1	NEc SE SE 27-9-4 E	T.D. 4680	Dry
Independent et al	1	SWc NW NE 23-7-4 E	3782-3932	940
Magnolia	1	NWc NE 24-7-4 E	T.D. 4175	75
Pierce et al	4	SWc NE NW 30-7-4 E	3800-3874	310
Magnolia	1	NWc NE 19-7-5 E	4224-4237	6

Rogers County

Company	Well No.	Location	Depth	Init. Prod.
Hinman	1	SEc SW 8-21-16 E	600-613	3M

Seminole County

Company	Well No.	Location	Depth	Init. Prod.
Continental	1	SWc SE 33-11-8 E	4140-4146 OWD	45
Barnsdall	3	SWc NW 1-9-5 E	4361-4371	1074
Gypsy	1	SWc NE 1-9-5 E	4339-4353	1317
Texas	5	NWc SE SE 2-9-5 E	4411-4427	375
Barnsdall	4	NEc 10-9-5 E	4610-4618	600
Magnolia	8	NEc SE SE 11-9-5 E	4424-4431	700
Magnolia	4	NWc SE SW 12-9-5 E	4350-4361	194
Carter	7	NWc NE NW 3-9-6 E	4362-4375	41
Twin State	2	NWc SE NW 4-9-6 E	4455-4459	630
Wilcox	8	SWc NE NW 4-9-6 E	4395-4445	323
Sinclair	6	SWc NE SE 9-8-6 E	4140-4148	185
Mid-Continent	5	NEc SE NW 12-8-6 E	4658-4661	680
Carter	2	NEc SW 24-8-6 E	4460-4475	90
Carter	2	NWc NE SE 23-8-6 E	4618-4622	660
Blackwell	4	NEc SE SE 35-8-6 E	4251-4255	60
I. T. I. O.	4	NWc SW SE 35-8-6 E	4502-4504	247
Blackwell	7	NWc NE SE 35-8-6 E	4413-4419	662
I. T. I. O.	1	SEc NE SW 36-8-6 E	4240-4244	475
Magnolia	6	NWc NE NW SW 32-8-6 E	4175-4182	70
Sinclair	7	NEc SE 9-8-6 E	4208-4216	252
Texas	3	SWc SE SE 2-9-5 E	T.D. 4337	Dry
Snowden et al	1	SWc NW NE 15-10-8 E	T.D. 3552 OWD	Dry
I. T. I. O.	12	SEc NW NE 2-7-6 E	T.D. 4544	Dry
Prairie	4	SWc NW SE 3-9-5 E	T.D. 4359	Dry
Prairie	2	SEc SE SE 34-8-6 E	T.D. 4590	Dry

Stephens County

Company	Well No.	Location	Depth	Init. Prod.
Beard et al	1	SWc 30-1-8 W	T.D. 2195 OWD	Dry
Ellis	4	SWc NW 34-1-8 W	1925-1930	200
Hupp et al	2	SWc NE 34-1-8 W	1722-1725	20
Owen-Wood	6	CSL SE NW 12-2-8 W	2063-2086	117
Magnolia	1	NEc SE SW 13-1-4 W	2763-2812	332
Smith	1	NEc NW NE 25-1-4 W	3280-3322	10M

Wagoner County

Company	Well No.	Location	Depth	Init. Prod.
Bu-Vi-Bar	1	NEc SE 30-18-15 E	1246-1271	6
Peterson et al	1	C NE SW 23-16-16 E	903-947	4M
Shaffer	1	NEc SW NW 21-17-15 E	T.D. 1977	Dry

KANSAS

Butler County

Company	Well No.	Location	Depth	Init. Prod.
Bronson et al	3	CSL NE SW 5-27-6 E	2725-2760	100
Appleman et al	1	NWc SW NW 36-24-4 E	T.D. 863	Dry

Chase County

Company	Well No.	Location	Depth	Init. Prod.
Empire et al	1	SEc NW 24-22-9 E	T.D. 2697	Dry

Cowley County

Company	Well No.	Location	Depth	Init. Prod.
Vickers et al	1	SEc NW NW 22-32-4 E	T.D. 3017	Dry

Dickinson County

Company	Well No.	Location	Depth	Init. Prod.
Frank et al	1	SWc SE 10-16-4 E	T.D. 2658	Dry

Ellis County

Company	Well No.	Location	Depth	Init. Prod.
Mid-West	19	NWc SW SE 27-13-16 E	T.D. 3870	Dry

Greenwood County

Company	Well No.	Location	Depth	Init. Prod.
Skelly	1	C SWC NE NW 21-22-10 E	T.D. 2305	Dry
Federal	3	Lot 39, North	T.D. 990	Dry
Polhamus et al	3	SWc NW 26-24-9 E	T.D. 2684	Dry
Christy et al	1	CSL Se NE 36-24-12 E	1625-1650	200
Higgins et al	1	NWc NE NW 2-26-10 E	1988-2026	5

Marion County

Company	Well No.	Location	Depth	Init. Prod.
Empire	1	NEc SW NE 9-20-4 E	T.D. 2675	Dry

McPherson County

Company	Well No.	Location	Depth	Init. Prod.
Mid-Kansas	1	SWc NE 26-19-3 W	T.D. 3633	Dry

Sumner County

Company	Well No.	Location	Depth	Init. Prod.
Roxana	3	SEc NW NE 25-31-2 E	1841-1902	325
Roxana	4	NWc NE NE 25-31-2 E	1848-1909	300
Roxana	1	NEc SE 26-31-2 E	1869-1908	150
Jarvis et al	1	Out lot 22, 14-32-2 E	1967-2088	400
Roxana	3	Out lot 22, 14-32-2 E	1997-2080	400

a temporary shut down. The well is now in the Simpson at 4265 feet with nothing showing. A small show was found at 4251 feet. The test is being watched with much interest as an indication of what may be expected along the trend southwest of Little River since the well is almost three miles southwest of the Snowden and McSweeney well.

Production to the east of the Burbank field apparently will be spotty, as was indicated this week when the Phillips Petroleum Co's No. 2 in the SEc of 17-27-6 was dry at 3032 feet in broken lime. A broken sand was encountered at 2911 to 2963 feet, but a 150-quart shot brought no oil or gas. This is a north offset to the Oliphant well in 20-27-6 in which a major interest was purchased by the Prairie Oil & Gas Co. recently. On the evidence of its failure in No. 2 Phillips has plugged its No. 5, a quarter of a mile north at 1400 feet.

That the Prairie made a good buy in the Oliphant property is evidenced by the completion of No. 5 location on the lease, in the SE NE NE of 20-27-6, this being one location south of the big well, which at its top made around 5,000 barrels. The No. 5 well found sand at 2901-43 feet and had an initial flow of 90 barrels per hour.

In Logan county the Roxana Petroleum Corp. has 1,000 feet of oil in the hole in its No. 1 Stephens in the SWc of 29-19-4W. This well is drilling at 5782 feet in sandy lime. Formations are reported to be running about 65 feet lower than in the discovery well a quarter of a mile distant.

A number of other tests in this general area are reaching interesting depths. The Texas Pacific Coal & Oil Co. is drilling at 5935 feet in green shale topped at 5886 with nothing showing in its No. 1, in 27-18-4W.

Air Lift May be Withheld In New Seminole Areas

By Telegraph

TULSA, Dec. 13.—Seminole district operators will meet Dec. 15 to consider extension of the present restrictive agreement after Jan 1. Several other proposals will come before the meeting, one important one being the refraining from the use of the air-

New Field Operations in Oklahoma, Kansas, North, North Central, West and Panhandle Texas

OKLAHOMA

Carter County

Company	Well No. Farm	Location	Remarks
Simpson et al	1-Crockett	NE SE 22-1-3 W	Location
Merrick et al	2-Denny	SE NW SW 20-1-3 W	Location

Creek County

Bartlett	1-McIntosh	NE NW NW 28-18-9 E	Location
Continental	1-Strip	SW BW NW 25-18-11 E	Location
Burlingame et al	14-Miller	C SW NW 13-19-8 E	Location
Steinberger et al	2-Smiley	C NW NE 19-19-8 E	Location
Page Bros.	3-Bishop	NEc SW SW 13-17-8 E	Location
Olean	1-Lewis	SE NW 10-15-8 E	Location

Grady County

Carter	1-Tims	SWc NE 17-4-6 W	Location
Carter	4-McCaughtry	SWc NW NW 26-5-8 W	Location

Hughes County

Winkler et al	1-Tiner	C SE SW 31-5-9 E	Location

Jefferson County

Skelly	2-Ryan	SW NE SE 23-6-6 W	Location
Heydrick et al	1-Lahman	SE SW SE NW 17-7-5 W	Location

Kay County

Harris et al	1-Bechtel	C NW SE 22-29-1 W	Location
Carter et al	6-Shimp	C SW SW 17-29-1 E	Location
Greer et al	1-Skein	C SE SW 19-29-1 E	Location
Blackwell O & G	3-Athey	SE NE SE 35-28-1 W	Location
Greer et al	1-Lane	SE NE NE 30-28-1 E	OWD
Greer et al	1-Keehler	C SE NE 30-28-1 E	Location
Waggoner et al	1-Fruits	NW NE NE 2-25-2 W	Location
Marland et al	2-Miller	NE SW 9-25-2 E	Location

Muskogee County

Sioux	1-Bradshaw	NE SE NW NE 24-13-18 E	Location
Indian Capital	1-Smith	NE NW SE NE 7-14-19 E	Location
Metzer et al	1-Townlot	SW SE 34-15-18 E	Location
Denton et al	3-Jefferson	NE SE 32-15-15- E	Location
Boyle et al	1-Lowery	CWL NW SW 9-15-15 E	Location
Boyle et al	4-Barnett	C NE SE 8-15-15 E	Location

Okfuskee County

Umburm	2-Tiger	CNL NE NW 2-10-11 E	Location
Umburm	1-Tiger	NW SE NW 2-10-11 E	Location
Atlantic	1-Robinson	C NW SW 12-10-11 E	Location

Okmulgee County

Sunray	1-Cooper	NE NW 36-16-13 E	Location
Papoose	2-Francis	SW SE 25-16-13 E	Location
M. T. C. Oil Co.	1-Cooper	SE SW 25-16-13 E	Location
Roberts	4-Rentie	CSL SE NW 18-14-15 E	Location
Henthorn	6-Rentie	NE SW NE 18-14-15 E	Location
Richardson et al	4-Barnett	C SW SW 6-14-15 E	Location
Peterson	4-Ware	NE NW SW 9-15-14 E	Location
Trans. Cont. et al	2-Deere	CWL NE SW 9-15-13 E	Location

Osage County

Devonian	3-	SE NE NE 33-21-10 E	Location
Brown	2-	NE SW 3-26-6 E	Location

Payne County

Magnolia	1-Jennings	SW NW 10-18-5 E	Location

Pontotoc County

Whitney et al	2-Shields	SW SE 20-5-8 E	Location
Louisiana	10-Perry	NW 20-5-6 E	Location
Louisiana	7-Perry	SW NW 20-5-8 E	Location
Louisiana	12-Perry	NE 19-5-8 E	Location
Louisiana	7-Harjo	NW SW SW 17-5-8 E	Location
Louisiana	8-Harjo	SW 17-5-8 E	Location
Westheimer	1-Miller	SE 8-5-8 E	Location
American	1-Mercer	CE½ SE 8-4-6 E	Location
Homa Okla.	8-McCall	NW NE SE 17-5-8 E	Location
Homa Okla.	6-McCall	SW NE 17-5 8 E	Location
Homa Okla.	7-McCall	SE SW NE 17-5-8 E	Location

Pottawatomie County

Mangolia	2-Risenhoover	NE SE NE 14-7-4 E	Location
Gypsy	2-McGee	NW SW NE 23-7-4 E	Location

Seminole County

Magnolia	3-Rhoades	SW NW SW 12-8-6 E	Location
Gypsy	2-Henderson	NEc 13-8-6	Location
I. T. I. O.	8-Goforth	NEc NW NE 15-8-6	Location
Slick	1-Coker	NE SW 31-8-6	Location
Slick	1-Goebelt	NW NE SE 12-6-6 E	Location
Louisiana	1-Hulwa	SW NW 8-5 8 E	Location
Louisiana	1-Punluste	SWc 8-5-8 E	Location

Stephens County

Schermerhorn	2-Shields	SE NE SW 13-1-4 W	Location
Coline	3-Malechi	NE NW NE 31-1-8 W	Location
Medlin	7-Taliaferro	SEc SW 27-1-8 W	Location
Owen-Wood	7-Massey	CNL S½ SE SW 12-2-8 W	Location

Tulsa County

Transcontinental	2-Spuire	CNL NW SE 8-16-14 E	Location
Savoy	1-Agent	SEc NW NE 8-16-14 E	Location
Sheridan	1-Morton	SWc NW NW 12-16-12	Location
George	1-Brown	NWc SW 7-17-13 E	Location
Black et al	1-Oswalt	NWc SW SW 6-17-13 E	Location

Wagoner County

Peterson et al	1-Adams	C SE NW 23-16-16 E	Location
Flesher	1-Johnson	C NE 18-17-15 E	Location

TEXAS

Brewster County

Company	Well No. Farm	Location	Remarks
Hickey et al	1-Jackson	NEc Sec-182, Blk-9 GH&SA	Location

Crane County

Gulf Prod.	45-McElroy	NW SE NW Sec-200, Blk-F CCSD & RGNG	Location
Gulf Prod.	46-McElroy	NE SE NW Sec-200, Blk-F CCSD & RGNG	Location

Crockett County

Gulf Prod.	3-Thompson	Sec-71, Blk-1 I&GN	Location

Edwards County

Devils River O & G.	1-Turney	C W½ W½ Sec-167 CCSD & RGNG	Location

Gray County

Danciger	5-Jackson	SEc NE NW Sec-88, Blk-2 H&GN	Location
Phillips	1-San	NWc Sec-87, Blk-2 H&GN	Location
Shamrock	1-Clayton	NEc SW Sec-50, Blk-25, H&GN	Location
St. Clair	1-Howe	NEc Sec-32 Herman	Location

Howard County

Sun	1-Settles	SEc Sec-135, Blk-29 W&NW	Location
Magnolia	9-Chalk	CN½ NE Sec-124, Blk-29 W&NW	Location
Magnolia	4-Hyman	C SE SW Sec-113, Blk-29 W&NW	Location
Magnolia	2-Roberts	NEc NW Sec-157, Blk-29 W&NW	Location

Irion County

Webb	1-Nutt	(Gonzales County Survey)	Location

Midland County

Schoup et al	1-Parks	C NW Sec-34, Blk-41, Twp-2 S. TP	Location

Pecos County

California	4-Smith	Sec-35, Blk-194 TCRR	Location
California	5-Smith	Sec-35, Blk-194 TCRR	Location
California	6-Smith	SWc Sec-35, Blk-194 TCRR	Location
California	7-Smith	Sec-35, Blk-194 TCRR	Location
Marland	8-Yates-A	Sec-60, Blk-1 I&GN	Location
Mid-Kansas-Transc.	8-Yates-C	Sec-60, Blk-1 I&GN	Location
Mid-Kansas-Transc.	9-Yates-C	Sec-60, Blk-1 I&GN	Location
Mid-Kansas-Transc.	10-Yates-C	Sec-60, Blk-1 I&GN	Location
Marland et al	12-Yates	Sec-34½ TCRR	Location

Upton County

Texas	5-Perry	Sec-3 GC&SF	Location

Wheeler County

Woodtex	2-Linkey	CWL NW NE Sec-126, Blk-23 H&GN	Location

Winkler County

Southern Crude	88-Hendricks	NEc Sec-30, Blk-5 PSL	Location
Atlantic	2-Hendricks	NE SE NW Sec-29, Blk-5 PSL	Location
Southern Crude	90	SW SE SW Sec-33, Blk-26 PSL	Location
Gibson et al	1-Leck	C SW Sec-3, Blk-74 PSL	Location

KANSAS

Cowley County

Trees et al	2-Dickerson	SEc SW NE 30-30-4 E	Shut Down
Trees	1-Hittal	SWc SE NE 21-31-4 E	Rig on ground
Trees	1-Estus	SEc NW 12-32-6 E	Location
Barnsdall	1-Roberts	NEc SE NE 7-33-3 E	Building rig
Lewis et al	1-Newman	SWc SE 35-34-3 E	Machine
Brady Bros.	1-Koestler	SEc NW NW 35-34-3 E	Location

Greenwood County

White Eagle	1-Welch	SEc 33-24-10 E	Rig
Christie	1-Christie	SWc NW 31-24-13 E	Rig. Machine
Perkins et al	1-Cox	NEc SW SE 15-25-11 E	Location
Empire	1-Kolb	NWc NE 15-25-13 E	Rigging up
Devine et al	1-Bradford	SWc NE 22-26-11 E	Spudding

Lyons County

Bason et al	1-Elrod	NEc 36-21-11 E	Location

Marion County

Johnson et al	1-Thompson	SWc NE¼ 26-17-4 E	Location

Russell County

Wilcox	3-Mermis	SEc 18-12-15 W	Location

Sherman County

Hannsen et al	1-Murray	NEc SW NW 22-7-4W	OWD Rig

Sumner County

Roxana	2-Buffington	Lot-9, 14-32-2 E	Location
La Robb	2-Buffington	NE¼ 14-32-2 E	Building rig.
Roxana	5-Emerich	SWc NW SE 14-32-2 E	Rig
Stanley et al	2-Scroggings	14-32-2 E	Rig on ground
Roxana	1-Scroggings	Tract 5, 14-32-2 E	Location
Roxana	1-Rothwell	SEc NE SW 14-32-2 E	Location
Darby	2-Burket	14-32-2 W Blk-87	Rig

Woodson County

Young et al	1-Otto	SWc NW NW 21-23-14 E	Location

lift on certain new areas.

The important wildcat of the Mid-Continent Petroleum Corp., in Sec. 27-7-6 south of the Little River pool and in the general area of the new pool recently opened by the Independent Oil and Gas Co. this morning, has 2600 feet of water in the hole from the Simpson formation. In the same area, however, Barnsdall has a hole full of oil in its test in 22-7-6. This well ran higher on formation than other wells in the area, including the Independent well, getting the Wilcox at 4,250.

Great Progress Made Towards Conservation

By Warren C. Platt, Editor

THE oil industry made great progress toward practical oil and gas conservation at the annual meeting of the American Petroleum Institute at Chicago last week. But the greatest achievement was in the spirit of the meeting, a spirit that, sad to relate had been noticeably lacking in the past. The actions taken on conservation showed a tremendous advance in the thought of the industry, an advance it was easy to see resulting from serious study the past several years of the whole problem of the industry's responsibility to the public.

Probably the most outstanding feature of the meeting was the industry's showing that it did not fear to deal with legislatures and government officials in solving its problem. Up to this meeting the industry had evidenced in many ways an almost frenzied fear—and not without cause either—of having anything whatever to do with government connection with its internal problems. There is no doubt that the industry may have to grapple with foolish and even vicious legislative proposals. But the industry is advancing to the task courageously and without fear of the ultimate result.

The Chicago meeting denotes the creation within the oil industry of the new type of executive in American business, the type that not only can deal in manufacturing, distributing and financing problems but that can deal intelligently and fairly with public and stockholders alike in the relationship of organized American business to the great American public.

The oil industry's own record in the past, we submit, has shown that its executives have been most backward in the development of their minds toward this new problem. There is probably no more misunderstood industry in the country today than oil. The responsibility for this unenviable position is squarely on the oil company executives. They have been afraid to deal intelligently with the general public. They have failed to stand up and proclaim the fact that their companies have for years at least, if not even for their entire history, dealt fairly, honestly and efficiently with the public. There has been much human reason for this attitude because of the many unjustifiable attacks on the industry. But the industry's leaders in the past have refused to recognize that these attacks are from relatively few persons who would turn and run if a counter attack were made, because these assailants are not interested in any reforms in the industry but in making such gestures before the public as will bring votes.

Some executives, it is true, have made much progress in recent years in changing their old attitudes, but leaders in other industries have far excelled them.

In milling around among the hundreds of oil men at this Chicago meeting and watching the new sentiment develop, one could not help being tremendously impressed with the new spirit of courage; of the intelligent aggressiveness, not only to present the industry's good acts and point of view, but to go to the public's representatives fearlessly and confidently for whatever help they may be able to afford the industry in the handling of its problems of today and of the future.

This change of thought of oil executives came about through a study of the facts concerning the problems before the industry, through the coming in of the big new fields of the past several years and through improvement in oil country engineering which showed that some general operating policy should apply to a whole field, the policy to be determined in the light of the needs of the public, of the industry and efficiency of operation.

The crystallization of thought was also undoubtedly due to the work of a number of men but the one we shall chiefly name is E. W. Clark, president of the Institute the past year, who was unanimously returned to that office despite his energetic pleas to the contrary. Mr. Clark put in much time traveling over the country the past year, attending many meetings, talking with many men, not urging any panacea of his own but trying to get all minds to focus on the main problem. How well he had succeeded probably not even he realized until after the Chicago meeting. No one else did, that is sure. With Mr. Clark in this work was R. L. Welch, secretary and general counsel.

The fact that E. W. Marland, who in previous years had been an ardent protester against government activity in oil, had turned to and after a great deal of work organized the technical men of the industry and brought up to the very present moment the facts, ideas and theories in relation to the present problems, reported for an extension of state legislation for the conservation of gas in oil sands, aided much in the advancement of thought at the meeting.

That Judge Beaty, chairman of the board of The Texas Co., a lawyer whose conservatism we believe no one ever attacked, and a group of equally conservative lawyers, recommended going to federal and state legislatures when necessary for such a law as would permit—not require—cooperative drilling and operating agreements, did much to make all realize that the industry's thought is changing.

Then from a sanitarium at Battle Creek, Mich., came a wire, right at the opening of the meeting, which closed the door on past differences and seemed to set the standard for friendly feeling which held the meeting throughout. That wire was from Henry L. Doherty, a pioneer advocate that the industry realize that there are some problems within it that it should attack more vigorously and that it must find some way to solve quickly or else suffer dire consequences from the public. Mr. Doherty wired that he forgot the past and congratulated the Institute on the progress which it had been making but which he had not been able to keep informed on due to his long illness at Battle Creek.

But with all this advancement in thought and the several official declarations for permissive legislation, one must not expect a complete revolution overnight in oil industry methods. The crux of it all will turn on what specific thing is to be done. That gets into practical operating problems.

President Clark in his opening address emphasized that the time had come to quit talking generalities and get down to definite facts. The oil industry has gone as far as it can on generalities. The question now is what to do with this field and that well and the wildcat way over the hill yonder.

However despite the great size of the problem, in view of the character of the meeting at Chicago, the industry is justified in expecting much from its leaders this coming year. And the industry will not be disappointed.

"Open All Night" Stations Profitable In Cities, Resort Districts

Staff Special
CHICAGO, Dec. 8

"OPEN ALL NIGHT" is a sign one seldom sees at a filling station. The words are associated usually with such familiar slogans as "Tables for Ladies" and "We Make Our Own Pastry". But there are a few all-night filling stations that are making money out of 24-hour service selling gasoline and oil only.

One of these stations is in Little Rock, Ark., property of the Gay Oil Co., headed by T. J. Gay. It is a super service station with six commercial departments housed in the same building with the company's main office and its famous information bureau for tourists. It is at the intersection of two boulevards, Third and Broadway, in the heart of town.

Men at this station are divided into three eight-hour shifts. The peak day shift consists of 15 men and three work all night.

Mr. Gay says the demand for Gay products in Little Rock is sufficient to justify at least one all-night station. There would be one somewhere in the business district even if the super service station were not there, but under the circumstances he considers this the ideal place to give the 24-hour service. Aside from the fact that the storage garage is there, the consistent night demand for gasoline and oil is in the down-town district, Mr. Gay believes. Night life is there; the unusual service is easy to advertise there, and it is not far out of the way for anybody in town who uses his car at night.

Long stretches of paved roads, across country, do not yield much night patronage for an oil station. There is a great deal of traveling at night on national highways but it has not proven of much benefit to the wayside station. A great many jobbers have inaugurated 24-hour service at stations on national highways in the last two or three years but have shortened the hours later because of lack of patronage after midnight.

G. L. Calvert, of the Quaker Oil Co., Plainfield, Ind., thought he had every logical reason to offer service to the public all night His station was on the "Old Trail," a federal road from Baltimore to Kansas City. Traffic seemed never to die out entirely at any time of night. So at his main station in Plainfield he inaugurated continuous service, but quit after three weeks.

DURING that three weeks Mr. Calvert had his night men mark down the hour and minute every sale was made, on the daily station report. Each day's business was tabulated, hour by hour, and each hour's profits were compared to one hour's expense at the station, consisting of one eighth of one man's daily wage and a proportionate share of the light bill. Business hours at that station begin at 4 a. m. in summer and at 4:30 in winter. They end as as soon as possible after midnight.

"Wayside filling stations that stay open all night usually have something else to sell besides gasoline and oil", Mr. Calvert said. "Recently I made a trip from Tulsa to Plainfield. I left Tulsa at 4 a. m. and got home before midnight. The tank full of gasoline bought the night before lasted until there were plenty of oil stations open along the way. But I bought fuel from wayside stations some of which kept open all night.

"ALL THAT I encountered were restaurants and filling stations combined, and some of them had small stocks of other things. Some were almost general stores. There were plenty along the way to take care of any late travelers, not to mention small town garages with a man on duty all night. I do not believe an all night station in a small town will pay with oil business only, even on the most traveled highway in the country."

Fred E. Bergfors, of the Quincy Oil Co., Quincy Adams, Mass., conducted some experiments with 24-hour service stations recently which convinced him that business in the dead hours of the night seldom is profitable. He operates some stations near pleasure resorts which provide enough business to justify late hours in the summer months. When the resort season closed Labor day, gallonage fell off so abruptly at these points that the closing hour was moved at once to the early part of the night.

"We have no set rule for establishing opening and closing hours at filling stations," Mr. Bergfors said. "We try to open each station as soon as patronage justifies it, and we like to keep them open as long as it is profitable to do so. We arrange hours and working shifts for the men differently at almost every station and we change these arrangements occasionally as conditions change.

Time of Sales is Checked

FRED E. BERGFORS, of the Quincy Oil Co., Quincy Adams, Mass., makes good use of actual figures in determining the profitableness of operating stations all night. His figures show the amount of business and the time of day or night this business was done at the stations.

"Every once in a while we run a test on a station for a couple of weeks to see how the business is coming in. We operate them all night for about two weeks, just to get statistics," Mr. Bergfors said. Attendants keep track of time on these daily sales reports when running a test, drawing a line across the sales record every hour. Executives have their sales chartered on an hourly basis, and it is easy to determine whether or not an hour's earlier or later closing will be justified from the net profits standpoint.

Would not frequent sales checks on an hourly basis yield much valuable information to company executives and give them a new slant on when the cash register rings loudest?

In Atlantic, Mass., a suburb of Boston, we have a 20-hour station the year round. We keep some stations open 18 hours, some 17 and others 16 hours. The peak of business comes at different times at different places and we arrange our men's hours accordingly. Every once in a while we run a test on a station for a couple of weeks to see how the business is coming in. We operate them all night for about two weeks, just to get statistics.

"During the course of a test, the station attendants do their work in the usual way, carrying it along with every detail at night as in day time, except in keeping the daily station report. The man in charge of the station, during a test, makes a mark clear across the report sheet every hour, and marks the time on the line. The mark is made just below the last sale. If there has been no sale for an hour the mark is made just below the previous mark.

"When this report is received at the office, the business is plainly divided by hours for the whole day. We can see immediately the unprofitable hours and we can see where the day's best business has been done. If the patronage from 2 to 4 a. m. does not offset the light bill and the wages of one man for two hours, we close at 2 and open at 4. We do likewise if the business is unprofitable from midnight until 6 a. m. We try to watch our stations closely; open them when they begin to pay and close them when they cease to pay."

"Staying open all night will not increase the volume of business in any community," an Illinois jobber said recently. "Of course the oil man owes something to his community and he should provide the motorists with gasoline and oil if they need it, but late emergency calls can be handled by garages, and almost every small town has a storage garage where a man is on duty all night.

"Furthermore," he said, "if one oil man decides to keep a station open all night his competitor will feel obliged to put on a similar service. So in the end every oil man might greatly increase his overhead expense at some station by keeping it open all night, and nobody get enough out of it to pay the cost. Most gasoline and oil is bought in day time and belated travelers and emergency callers are already trained to go to a garage."

A Wisconsin oil man added one valuable comment to the Indiana man's experience.

"Night gasoline sales," he said, "are profitable to a garage because the overhead of the establishment is paid by other things. Profits on gasoline are 'velvet' to the garageman and help him pay for his general 24-hour service. But the small profits from late gallonage usually would not be profitable enough to make me keep a station open all night. So I do not want to take this business away from the garageman who is my good customer."

J. M. Wolf, head of the Southern Minnesota Oil Co., Fairmont, Minn., has had experience which agrees with that of Mr. Calvert and Mr. Bergfors. He says there is good potential return from an all-night station in the lake country of Minnesota during the summer season, but that it falls off after Labor day when the resorts close. He has no 24-hour service stations himself but has a customer who runs one profitably.

"My customer sells tires and accessories and some other odds and ends that make his establishment pay in the late hours of the night. I do not care to go into side lines and the oil business alone will not pay all night. I find it profitable to have a dealer doing an all-night business where there is business to be had all night, but the burden is rather heavy for an establishment to sell oil and gasoline exclusively.

"Even if an all-night station did pay, I would not operate one because it would take business away from some good customers who sell a great deal of my merchandise in day time, as well as at night.

Big city operators have had different experiences from those of the men in smaller towns. The owner of a string of filling stations in Chicago recently said in discussing an all-night station in a residential section:

"I keep an all-around man on at night. We can do car washing and greasing and he can wait on the trade well. He works from 10 p. m. until 7 a. m., and the earnings from his work pays the rent on the property, his wages and the entire light bill."

Infringement of Contact Filtering Patents Charged in Suit

Staff Special
CHICAGO, Dec. 9

THE first lawsuit to be brought to clear up the status of the patents covering contact filtration of lubricating oils, has been filed in federal court in Tulsa. The plaintiffs are the Contact Filtration Co. of San Francisco and Max B. Miller & Co., Inc., of New York. The defendant is the Pierce Petroleum Corp.

The petition charges that, by practicing contact filtration of lubricating oils at its Sand Springs, Okla., refinery, the Pierce company is infringing five patents owned by the Contact Filtration Co.

The patents of which infringement is charged are: No. 1,404,374 and 1,404,375, issued to Marvin L. Chappell and Merle M. Moore, and assigned to the Standard of California; No. 1,564,501, issued to James W. Weir, one-half assigned by him to John C. Black; No. 1,572,465, issued to Weir and Black, and No. 1,547,682, issued to Paul W. Prutzman and by him assigned to the General Petroleum Corp.

General Petroleum Corp. and Standard of California were in interference proceedings in the patent office over applications by Chappell and Moore of the Standard and Prutzman of the General. These five men mentioned, Chappell, Moore, Weir, Black and Prutzman, started at about the same time, about 1919 or 1920, on the development of processes for filtering lubricating oils by mixing the oil with finely divided diatomaceous earth, acid-treated or not acid-treated, in the form of mud or dry.

All of the men except Prutzman were at that time in the employ of the Standard of California and most of the work was done at the El Segundo refinery of that company. Later Black left the Standard to become manager of refineries for the Doheny interests and Weir to become refinery manager of the Fillmore plant of the Ventura Refining Co., now a part of the California Petroleum Corp.

Perceiving that the use of the contact filtration process fitted in well with the centrifugal process of dewaxing bright stocks and long residuums which he was interested in promoting, Max Miller late in 1926 obtained from Standard of California and General Petroleum Corp. rights to license the use of contact filtration processes which he thereupon installed in several plants.

The Standard beat out the General in the interference suit but shortly thereafter the interests concerned formed the Contact Filtration Co. to take over all the pertinent patents owned by both companies. General Petroleum (Standard of New York) and Standard of California assigned their patents to the company. The patents of Black and Weir were bought and added to those owned by the holding company. Max Miller then obtained from the Contact Filtration Co. sole rights to license the use of processes coming under any or all of the patents owned by the company.

The petition asks that the defendant be required to account for and pay over to the plaintiff the profits derived from the alleged infringement and that it be ordered to pay damages three times the sum of the damages which the plaintiff may be adjudged to have suffered and that the defendant company be restrained from further using the process which is claimed to be an infringement.

Natural Gasoline Production in Seminole District Exceeds 850,000 Gallons

By J. C. Chatfield
N. P. N. STAFF WRITER

TULSA, Dec. 10

PRODUCTION of natural gasoline in the Seminole district now exceeds 850,000 gallons per day. This tremendous production of gasoline is coming from 47 plants in the five developed fields of the greater Seminole area. One new plant is being constructed.

The 47 operating plants are processing approximately 400,000,000 cubic feet of gas per day, much of which is being returned to the producing wells for gas lift operations. On the basis of present production the gas is yielding a little better than two gallons per 1,000 cubic feet. In some parts of the field plant yields are less than one gallon per 1,000 cubic feet while other plants are recovering more than three gallons per thousand.

A year ago there were only three natural gasoline plants in operation in the field. All of these were of the portable type producing a total of 30,000 gallons per day. At that time there were six plants being built in the field with a projected gas capacity of 86,000,000 cubic feet per day.

Sinclair Oil & Gas Co. is producing 135,000 gallons of gasoline per day from its combination compression and absorption plant in the SW NE of 10-8-6. This is said to be the greatest production of natural gasoline from any single plant in the world. The plant has 28 units handling 40,000,000 cubic feet of gas per day.

The second largest plant in the field in point of production is one of the oldest permanent plants in the field. It is operated by the Carter Oil Co. in the SE of 15-9-6. The plant has 18 units handling 22,000,000 cubic feet of gas per day and producing 85,000 gallons of gasoline.

Sinclair has the third largest plant in the NW NW of 35-9-6, an 18 unit absorption plant handling 25,000,000 cubic feet of gas per day and producing 80,000 gallons of gasoline.

An important part of the gasoline production from the field is coming from gas lift plants which were constructed primarily to aid in producing crude rather than gasoline. In these gas lift plants it is necessary to condense out gasoline from gas after it leaves the low stage compressors before it is charged to the high stage cylinders. Gasoline thus may be said to be a by-product of the plants. It is a highly important by-product, however, when it is considered that the gas pumped into the wells under high pressure picks up additional quantities of gasoline which must be condensed out as the gas comes back again to the compressor plant.

THE Indian Territory Illuminating Oil Co. has the largest group of these gas lift plants in the field. Its present production of gasoline averages 132,000 gallons per day from 12 plants which are compressing and returning to producing wells 101,000,000 cubic feet of gas per day. On the basis of 80 horsepower compressors this company has 190 units at its 12 plants.

In the field as a whole there are 504 compressors in operation at plants which are making gasoline. Three plants are operating on well pressure and have no compressors installed as yet. Two of these plants are of the absorption plant and the other is a simple cooling coil sysstem with an acccumulator tank.

Sinclair Oil & Gas Co.'s total production from its five plants is now 257,000 gallons per day. The Carter Oil Co. has a current production of 184,000 gallonos per day from seven plants. Totals for other companies

Natural Gasoline Plants in the Seminole District

(Corrected to Dec. 10)

Company	Location	No. Units	Type	Gas Handled Millions Cu. Ft. per Day	Gasoline Prod. Gal.
Amerada Pet. Corp.....	NE 16-9-5	7	Abs.	4	15,000
Amerada Pet. Corp.....	SW NE 23-9-6	*	Cooling	..	2,000
Amerada Pet. Corp.....	SW NW 15-8-6	7	Abs.	4½	12,000
Barnsdall Oil Co.....	NE 15-9-5	10	Comp.	14½	27,000
Carter Oil Co.....	SE 15-9-6	18	Abs.	22	85,000
Carter Oil Co.....	NW SW 34-10-6	18	Abs.	22	50,000
Carter Oil Co.....	NW SW 35-9-6	3	Comp.	6	14,000
Carter Oil Co.....	NW NE 23-8-6	11	Comp.	8	25,000
Carter Oil Co.....	C N½ S½ 23-8-6	24	Comp.	5	3,000
Carter Oil Co.....	SW SE 15-8-6	8	Comp.	5	4,000
Carter Oil Co.....	SW NW 14-8-6	13	Comp.	4	3,000
Crosbie Oil Co.....	SW NW 9-9-5	6	Abs.	4	10,000
Empire Oil & Ref. Co...	SW SW 13-8-6	*	Abs.	4	10,000
Empire.....	SW SW 14-8-6	*	Abs.	4	10,000
Empire.....	SE SW 15-8-6	8	Abs.	12	23,000
Empire.....	NW SE 24-9-6	7	Abs.	10	20,000
Empire.....	NE NW NE 34-9-6	3	Abs.	5	10,500
Forrest E. Gilmore Co..	SE 10-8-6	4	Comp.	3½	6,000
Forest E. Gilmore Co...	SW NW 13-8-6	3	Comp.	3	7,000
Forrest E. Gilmore Co..	NW NE NW 23-8-6	3	Comp.	3	7,000
Forrest E. Gilmore Co..	E ½ SE 35-8-6	8	Comp.	6	15,000
Gypsy Oil Co.....	C NW 16-9-5	6	Abs.	2¾	6,000
Independent O. & G. Co.	SE NE 26-9-6	8	Abs.	5½	12,000
I. T. I. O. **.....	NW NW 15-8-6	16	Comp.	8	10,000
I. T. I. O.....	NE 15-8-6	21	Comp.	10	15,000
I. T. I. O.....	NE NE 15-8-6	15	Comp.	8	5,000
I. T. I. O.....	SE SE 15-8-6	24	Comp.	12	12,000
I. T. I. O.....	NE NW 22-8-6	24	Comp.	12	12,000
I. T. I. O.....	SW SW 13-8-6	20	Comp.	10	17,000
I. T. I. O.....	SW NW 24-8-6	8	Comp.	4	6,000
I. T. I. O.....	NE NE 2-7-6	16	Comp.	8	10,000
I. T. I. O.....	SW SE 35-8-6	10	Comp.	5	10,000
I. T. I. O.....	SE NW 1-7-6	13	Comp.	7	15,000
I. T. I. O.....	SW NE 2-7-6	11	Comp.	11	12,000
I. T. I. O.....	SW SE 36-8-6	12	Comp.	6	8,000
Magnolia Pet. Co.....	NW SE 10-9-5	12	Abs.	5	10,000
Pure Oil Co.....	NE SW 26-9-6	14	Abs.	8½	16,000
Pure Oil Co.....	SE NW 14-8-6	20	Comp.	20	28,000
Roxana Pet. Corp.....	SE NE 16-8-6	4	Abs.	5	10,000
Sinclair O. & G. Co.....	NW NW 35-9-6	18	Abs.	25	80,000
Sinclair.....	NW NW 35-9-6	6	Comp.	4½	10,000
Sinclair.....	NE NE 22-8-6	12	Comp.	11	22,000
Sinclair.....	SW NE 10-8-6	28	Comp.	40	135,000
Sinclair.....	NW NE 12-9-5	4	Comp.	3½	10,000
Victor Gasoline Co.....	S½ NW 16-9-6	8	Abs.	5	7,500
Victor.....	S½ SW 10-8-6	6	Abs.	7	12,000
Victor.....	W½ NE 11-9-5	7	Abs.	6½	13,000
Victor.....	NW NW 10-9-5	..	Abs.	Bldg.	....
Totals.....		504		399¾	862,000

*No Compressors installed. Plants running on well pressure.
**All units at I. T. I. O. gas lift plants are shown on basis of 80 H.P.

in gallons per day are as follows: I. T. I. O. 132,000 gallons; Amerada Petroleum Corp., 29,000 gallons; Barnsdall Oil Co., 27,000 gallons; Crosbie Oil Co. 10,000 gallons; Empire Oil & Ref. Co. 73,500 gallons; Forrest E. Gilmore Co. 35,000 gallons; Gypsy Oil Co. 6,000 gallons; Independent Oil & Gas Co., 12,000 gallons; Magnolia Petroleum Corp. 10,000 gallons; Pure Oil Co., 44,000 gallons; Roxana Petroleum Corp. 10,000 gallons; and Victor Gasoline Co. 32,500 gallons.

An accompanying table gives the location of each plant, present daily average gas being handled in millions of cubic feet and present daily average net production.

The importance of the Seminole field as a factor in the present condition of the natural gasoline field will be seen more clearly when it is mentioned that U. S. Bureau of Mines figures for October showed total production of natural gasoline in the United States to be 4,650,000 gallons per day during that month. This was an increase of 400,000 gallons per day over January. Of this increase the Bureau showed 300,000 gallons to be from the Oklahoma-Kansas district. Gasoline production of the Seminole field today is nearly half as great as the total production of Oklahoma and Kansas plants was in October and almost one fifth as great as the production of all plants in the United States.

Wire Rope Distortion Results From Drilling Practice

By Paul Wagner
N. P. N. STAFF WRITER

CHICAGO, Dec. 8

THE present trend in cable tool drilling to greater depths is bringing about a critical condition that to date has not been thoroughly analyzed, the wire rope specifications committee of the American Petroleum Institute standardization group was told at its Monday meeting.

"Heavier tools, along with deeper holes," the rope manufacturers subcommittee reported, "has more than doubled the static tension which is still held by the same primitive clamp of the same length as on the shallow holes, which requires correspondingly greater pressure to hold the drill line without slipping."

The result of this heavier pressure is, according to the manufacturers, a distortion of the rope, except in the case of perfectly fitted slips. Any undue wear of the slips from any cause will magnify the distortion of the rope. It will be appreciated, they point out, that with the heavy tension on the rope the clamping pressure will be great enough to compress the rope below its manufactured diameter, or that corresponding to the tension under which it works; that is, the diameter of the rope above the clamp is considerably greater than within the clamp.

In other words, the manufacturers pointed out that equilibrium against slippage is maintained by pressure within the clamp and the enlarged diameter above. The margin by which this condition is maintained is extremely small; therefore, it is not difficult to visualize what happens when a slight release in pressure is made to allow slipping, namely, the first movement of rope concentrates the abuse on the enlarged diameter just entering the clamp, which must instantly conform to the reduced diameter in the clamp coupled with the tension below it.

The heat effect of the slippage may be readily calculated, knowing the rate of slipping and the load or tension, according to the report. If the exposed surface of the rope corresponded to a solid round bar of the same diameter the peripheral contact surface would be great enough to dissipate the heat. This, however, is not the case with a rope, as it only has six minute surfaces of contact along the crowns of each strand, causing insufficient intensity of pressure to generate excessive heat. This hardens the wire and makes it brittle, which explains the appearance of cracked wires at an early stage in the use of a line.

CONSIDERING another phase of slippage, namely, the driller is trying to pull through the clamp a rope which is approximately $\frac{1}{16}$-inch larger than the opening of the clamp. This contraction cannot take place without a lengthening of the lay and this excess twist is crowded into the rope above the clamp, causing the strands to become loose in the center.

Now consider the case of elliptical slips under the aforementioned condition, which will cause high, or drawn, strands when this portion of the rope is later forced through the clamp. The ultimate position of these high, or drawn, strands finally concentrate at considerable distance from the point of original abuse.

Experiments have shown that damage causing high or low strands will result in the damaged section ultimately adjusting itself at times as far as 1,000 feet away from the original point of abuse, as drilling operations proceed, the manufacturers point out.

The practice of slipping the clamps when the liners are of too small size is generally indicated by parallel wear or broken wire on opposite sides of the rope.

What the manufacturers describe as the vicious practice of slipping the rope through the clamp in cable tool drilling in place of turning down temper screws is found to be largely the result of failure to improve methods of feeding rope into the hole.

Drillers, it is pointed out, have adopted the slipping expedient in order to increase the speed of drilling. It is the unanimous recommendation of the rope manufacturers sub-committee that improved methods of rope feed should be devised to eliminate this practice, which, the manufacturers say, has ruined more drill lines than any other single form of abuse; and until such a clamp is manufactured the manufacturers sub-committee strongly recommends the discontinuance of all clamp slipping on drilling operations.

Portable Vacuum Cleaner Described in Bulletin

CONNERSVILLE, Ind., Dec. 12.—United Vacuum Appliance Corp. has just published a bulletin on the Connersville Auto-Vac, which is a vacuum cleaner for car interiors for use at filling stations, garages, auto laundries and shops where cars are cleaned. The portable unit is a small hose-like device with the vacuum at the end which can be easily run over carpets, ceilings, cushions and pockets in the car. It can be used without permanent piping, whereas the stationary type, which is equipped with legs instead of wheels, is permanently connected to the electric line and a pipe run to wherever the hose is to be attached at the point of cleaning. It has no handle nor electric cord and can be installed anywhere without concrete foundation.

Anderson Heads Tulare Oil

LOS ANGELES, Dec. 9.—Frank E. Anderson, succeeds L. E. Schoenemann, as president of the Tulare Oil and Mining Co. which holds about 400 acres of oil land in the McKittrick area. L. L. Abercrombie was elected first vice-president and C. W. Cobb secretary. Two Los Angeles men, formerly residents of Tulare, Charles B. Richardson and W. H. Hevern, are members of the board of directors.

Giving Away Pumps and Tanks Works Evil to Both Public and Marketer

By B. H. Anglin*

Presented before American Petroleum Institute, Chicago, Dec. 5-8

I HAVE been called upon to present a paper upon the evils incident to the loaning or leasing of dispensing equipment—a subject which practically everyone recognizes as one of the worst evils in petroleum marketing, for which no adequate remedy has yet been found, and about which little new can be said.

As far as the loaned equipment evil is concerned, there is and can only be one complete cure for it and that is to cut it out. That the time is ripe for at least a definite effort towards a betterment of this condition is made evident by activities upon the part of jobber marketing associations in this direction.

I have in mind more particularly the Virginia Independent Oil Men's Association, a full report of whose activities can found in the NATIONAL PETROLEUM NEWS of Oct. 26, and the New Jersey Oil Trade Association. In fact, a questionnaire submitted by the latter association to all the oil trade associations throughout the United States brought an almost unanimous response that something should and could be accomplished to stop this abuse.

The interests involved may be divided into four classes: first, the public; second, the equipment manufacturer; third, the dealer or retail operator; fourth, the marketer.

As to the interests of the public, I believe it is an economically sound principle that once the cost of doing business finds a reasonably constant level, that cost must of necessity be absorbed in the price of the product, and certainly the practice of promiscuous leasing of dispensing equipment in the final analysis must cost the public much greater sums than any benefit they may enjoy as a result of this practice. I believe it is also economically sound that the lower the cost to the public of a staple commodity, the greater the consumption, and that any step tending to improve the ratio of volume to investment must ultimately result in lower cost to the public and, consequently, is of direct interest and benefit to them.

As to the equipment manufacturer, I am informed by Mr. Niedrach of the New Jersey Oil Trade Association who has been most active in this movement, that in discussing the matter with equipment manufacturers they made claim that there was a total lack of stability due to their inability to find a market among actual users of equipment where they could sell on quality and service.

At first sight it might appear that the elimination of loaned equipment would work a hardship upon the retail trade. I believe that a little thought would convince anyone that there would be no one more greatly benefited than the retailer by the elimination of promiscuous leasing of gasoline and lubricating dispensing equipment. Today one can hardly drive ten miles along any road within the United States without realizing that it has been made possible for many undesirables to enter the business, many of them wholly irresponsible financially, and credits and markets have suffered as a result.

To quote William Thompson, district manager for the Texas Co. and a member of the Code Committee of the Virginia Independent Oil Men's association: "A man no longer needs the proverbial shoestring to open a filling station. All he requires is an idea that he should operate a filling station. The oil company informed of the idea will build him a station, install the latest types of equipment, pave the drives with concrete, stock the station with gasoline and oil, and even finance him to the extent of $1,000 to buy tires because the tire manufacturer had withheld credit."

Certainly in a given area in which a given marketer already has sufficient outlet or equipment to service public demand for his product, the addition of a single pump has little or no effect other than that of diminishing the gallonage put through all other pumps within a given radius and is directly hurtful to all dealers, more particularly those who are already handling his product.

THE obstacles in the path of better marketing of petroleum products are many, are of greatly varied character, and arise from many different sources. First, in any endeavor to reach some answer to a common problem there is always the bugaboo of practices in restraint of trade. I note in the NATIONAL PETROLEUM NEWS of Oct. 26 that the Virginia marketers have been endeavoring to overcome this obstacle through a committee cooperating with the Federal Trade Commission. Secondly, with the lack of any definition to the term "ethical marketing" we are prone at one time or another to indulge in certain marketing practices as exceptions only in a short time to have the exceptions become the rule. Another serious obstacle is the apparent lack of mutual confidence between petroleum marketers.

As to the complete elimination in the near future of the evil we are discussing, I doubt the possibility of this, regardless of how many solemn and binding agreements may be entered into, even though they be approved by the Federal Trade Commission, until every marketer, large or small, has a much more accurate and detailed knowledge of his marketing costs than he now possesses and the part played in these costs by the loaned gasoline pump, and so convinces himself that the practice will

Points to Keep in Mind

(As presented by Mr. Anglin in his talk on evils of giving away equipment)

1—The original cost of the equipment, maintenance and cost of withdrawals and transfers, lack of asset value of such equipment.

2—Spreading of the give-away practice to include accessory equipment, air compressors, air stands, driveways, paint, putty, etc.

3—Unnecessary and wasteful investment due to installing pumps in areas and at points already sufficiently equipped to serve the demand for a given gasoline and consequent reduction of throughput with already established dealers.

4—Encouraging undesirables into the business, with increased losses due to bad debts and dissipation of competitive investment, tending to keep retail markets demoralized.

5—Making a total bill for wastefulness for the public to pay.

*Indian Refining Co., Lawrenceville, Ill.

of its own weight fade out of the picture.

There is a glaring lack of intelligence due largely to the more or less general practice of pooling the profit and loss results of producing, refining, and marketing in one common accounting pot which so completely buries the relationship between marketing expense and marketing results that many evils now existing are completely lost sight of. If these were continually brought to the surface by better accounting, they would be gradually but nevertheless completely eliminated by sheer common sense. Nor need this system of accounting be in any way a complicated one. Given a knowledge of possible gross spreads within which a marketing organization must operate, it does not require any advanced accounting knowledge to so allocate expense as nearly as possible at the source of its occurrence as to determine approximately what operations or what investments are profitable or not as the case may be.

Within a few short years, the loaned gasoline pump has become the inglorious parent of many other evils. Its offspring are the leased air compressor, the air tower, paved driveways, canopies, etc. A few short years ago, the marketer who, as a trade inducement, painted the front of a garage was looked upon as indulging in unethical marketing, and yet today we are painting garages inside and out and extending our color scheme to those old-fashioned telephone booths which were originally designed to occupy some secluded corner and which now meet the eye scattered over the landscape painted in the most glaring colors. Most of this is marketing expense which is unnecessary, of no service to the public, and for which the public in the end must pay.

IN CONSIDERING leased or loaned installations of any character, there is nothing to indicate that much thought is ever given to the credit of the account, the likelihood of his remaining in business for any length of time, and whether or not the account in question has any sense of contract obligation and will not fall an easy prey to some competitor who may make him some temporarily better proposition. It is usually this type of account, with the everlasting argument that the other fellow will do it, who is always most insistent upon the marketer's meeting his demands in the everlasting change in types and styles of equipment—this now having come down to practically spring and fall fashions—long before the life of the existing equipment on hand can be exhausted or before it can be properly or conservatively written off the books.

This gives rise to a condition in the industry where it would seem that, regardless of what expense a marketer may have gone to in installing equipment, he can for the merest whim upon the part of an irresponsible account have his equipment thrown back on his hands, much of the investment dissipated, with little or no recourse other than to go out and seize upon some competitive account and subject the competitor to a like loss.

Even the most elementary consideration, that of volume to be dispensed, seems all too frequently to be lacking. The practice of dealers allowing several competitors to install their equipment is greatly on the increase, and with each additional pump at a given point the utility or value of each must be materially lessened. At the moment I have in mind a pump which we installed a year or two ago, upon the earnest solicitation of one of our salesmen, in a picnic grove, or maybe a bootlegger's paradise. I have allowed the pump to remain in this particular location as a monument to the judgment of this particular salesman. As an assurance that we would remain undisturbed in the enjoyment of the gallonage at this point—some 600 gallons per year—we have allowed a three-foot ditch to remain over which any unfortunate who ran out of gasoline would have to drive in order to be serviced. Yet, within the last two months, a legitimate and presumably efficient competitor has placed within ten feet of this pump one of their installations, and the magnificent yield of 600 gallons per year will now be split between the two.

Those of you who have had dealings with salesmen know that pumps were installed a few years ago on the theory that they would dispense 3,000 gallons per month; lately they have been installed on the theory that they will dispense 1,000 gallons per month. I need hardly go into the matter of actual volume dispensed after installation is made as compared to salesmen's estimates, nor will I hazard a guess as to what the salesmen's estimate of volume will be next year. It is an outstanding fact, however, that there is a sufficient number of pumps installed throughout the country to limit the average yield to about 500 gallons per month.

A SINGLE gasoline outfit installed will cost in the neighborhood of $250. Amortize or depreciate this equipment over a period of three years and you have an annual write-off of approximately $80. In addition to the initial cost of the equipment installation, the cost due to removal and transfers of equipment will, even for a small marketer, astound you if you figure it up.

On top of this, there is a very substantial item for maintenance and upkeep of installed equipment, the responsibility for which always goes with ownership. This will approximate $20 to $24 per year per pump. Much of this expense is due to insignificant items of repair which the user of the equipment could easily effect himself at little or no cost, were the equipment his property, as against demanding the services of a repair man which nearly always necessitates expense in the form of travel and lost time entirely out of proportion to the work actually accomplished.

I believe it is safe to say that the depreciation and maintenance of a gasoline pump would be conservatively between $100 to $120 per year which, on a throughput of 6,000 gallons, represents a marketing cost of approximately 2c per gallon. Add to this an average rate of quantity discount of approximately 1.4c per gallon and it is evident that there is little left out of the average spreads with which to meet the balance of your marketing expenses.

In an effort to squeeze present marketing expense within the spreads available, many marketers quite seriously consider their investments for loaned dispensing equipment as accumulation of assets and account them as capital. I believe this practice is open to question and that there is as much reason to consider a pump installation as current expense as there is to consider it as a capital investment. In this respect, the brewing business, which some of you older men will recall as a once-thriving industry in these United States, presents a striking parallel.

I believe that my own experience was common to many in the industry in that, having become an ex-brewer by special act of Congress, I found myself the possessor of some $500,000 worth of chattel mortgages, all of which had been properly and religiously recorded from year to year, which covered assets consisting mostly of obsolete cash registers, broken cuspidors, and dirty dish-towels.

Allow the present trend in the practice of loaning and leasing dispens-

What Price Free Pumps?

IT COSTS the oil marketing company, on the average dealer gasoline account, two cents a gallon for the pump given or loaned to the dealer through which the gasoline is dispensed, says B. H. Anglin, Indian Refining Co., Lawrenceville, Ill.

A gasoline outfit installed costs around $250, he said, and should be amortized at the rate of $80 a year. Cost of removal and proper maintenance will amount to $20 to $24 per year per pump.

This makes a total cost of from $100 to $120, which, on a throughput of 6000 gallons per year, represents a marketing cost of 2 cents a gallon.

Back Model Bulk Plant Ordinance, Fire Expert Advises

Staff Special
CHICAGO, Dec. 12

THAT the oil industry, through the American Petroleum Institute if possible, should work toward the adoption by municipalities of the National Fire Protection Association model ordinance for construction and operation of bulk storage plants, was proposed by Frank A. Epps, Tide Water Oil Co., in a paper presented at the group Institute meeting on Fire Prevention and Safety Dec. 7.

The industry heretofore has maintained a defensive attitude on Fire legislation, Mr. Epps pointed out, and the result has been an increasing number of municipal ordinances which impose unnecessary requirements in plant construction. "Even though the National Fire Protection Association's model ordinance is a compromise and does not entirely represent the industry's complete point of view, I feel that our position would be considerably improved if we could secure general recognition and adoption of this ordinance," he said.

He pointed out that field engineers of the fire protection association advise municipalities upon their needs for fire protection and fire ordinances and that it might be practical for the institute to support several men in this capacity whose business it would be to specialize in imflammable liquid problems arising in cities throughout the country and sponsor the adoption of the model ordinance.

Mr. Epps also suggested that the institute start a campaign throughout the country to educate the public and municipal authorities on the real hazards involved in the handling and storage of oil and gasoline.

"To date only one or two cities have adopted the model ordinance," said Mr. Epps. "Most cities desiring to enact an oil industry regulation will draft their own ideas and put them into effect. It is doubtful if many of them even know of the existence of the model ordinance. Each new regulation contains new and unheard of requirements, some of which are more drastic than any before heard of."

Because it is common practice for garages and service stations to install their storage underground, it seems to have become the consensus of opinion that the only way to handle gasoline is in underground tanks, he said, and consequently the authorities attempt to construe this as applying to larger tanks as well.

"Actually, it is doubtful if the fire record on underground tanks is any better than the fire record on above ground tanks constructed in conformance with modern practice. This is a point which is not known or appreciated by the would-be legislator."

Referring to the American Petroleum Institute survey of ten years experience in the industry on tank fires, Mr. Epps brought out that distances were recommended in the institute report for ordinary conditions which exist when modern gas-tight containers are used, and that relatively few fires have occurred in this type of tank and most of these had been unimportant, despite the fact there are in service today thousands of aboveground tanks located closer to adjoining property than the recommended distances.

"There is no justification to support model ordinance requirements in excess of recommendations obtained from this record," he said.

"There has been an absolute lack of uniformity in most fire ordinances directed at oil storage. It might be said that they are only uniform in one sense, that is, they are all needlessly harmful to the conduct of our efficient operation. It can be said with reasonable assurance that 95 per cent of them have been drawn by individuals who have never seen an oil fire, by men who know only from hearsay, and seldom that, what will happen when an oil tank burns. How is it possible, then, for us to obtain adequate and reasonable fire laws in the cities where we operate?"

ing equipment to continue for a few years more at the same rate of development as over the past three years and it does not require any great stretch of the imagination to picture the average throughput per unit reduced to a hopelessly unprofitable minimum and so unsound economically that our entire present marketing structure will come crashing down about our ears.

It must be evident that some basic readjustment must take place before the marketing end of the industry will find itself upon a solid foundation. Either spreads between wholesale and retail markets must be increased to absorb these costs, which means increased cost to the public, or this waste and abuse must be eliminated or reduced to a point which will permit our marketing on present spreads and still yield a fair and continuing profit.

While the finding of a complete answer to this problem may be some time off, it would seem that, with every responsible marketer recognizing the evil, something could be done towards placing the matter on at least a more ethical and reasonable basis.

Perhaps, through the good offices of the American Petroleum Institute, some standard practice, recognized by all and to which all could quite properly agree, could be designed to protect our respective interests so that whenever and for whatever reason a given account transferred his affections from one source of supply to another, under some such scheme the retiring marketer, upon presenting clear title and right of removal to the property, could, subject to proper rates of depreciation, look to the incoming marketer for reimbursement for his investment.

As part of this scheme and as a beginning towards the complete elimination of the evil, it might be proper to establish the practice of the account in question being obliged to pay for underground tanks, piping and installation charges covering non-removable equipment.

Tank Car Committee Session Speedy

CHICAGO, Dec. 12.—The complete docket of the American Petroleum Institute's general committee on railroad transportation was disposed of in one forenoon meeting Dec. 5. The most interesting discussion was in regard to the prevailing interpretation of Section 7, Rule 35, Consolidated Freight Classification.

In substance, the rule makes the shipper certify that the consignee is equipped with proper facilities to unload tank cars to permanent storage before consigning to the carrier any shipment of distillate having a flash point of 200 degrees Fahr., or under. The refiners wish to have the responsibility shifted to the consignee. Appointment of a sub-committee was authorized to confer with a committee from the American Railway Association to redraft this rule.

Additions, proposed by Col. B. W. Dunn of the Bureau of Explosives, to the rules for care of bottom outlet valves was also considered. The proposed additions would require all tank cars to be loaded with the cap off the bottom outlet valve and would prohibit cars from being shipped if the outlet valve should leak faster than 60 drops a minute. The committee agreed to Col. Dunn's proposal without protest.

After a representative of the National Industrial Transportation League had addressed the committee, soliciting membership from the American Petroleum Institute, it was agreed that a small sub-committee be appointed from the railroad transportation committee to confer with the N.I.T. league and act co-operatively in matters where mutual interest might develop.

The committee will meet again in Chicago on the third Tuesday in March, 1928.

The Seven Properties of Petroleum Products

AS a matter of fact, there are many other properties. But these seven are of vital interest to the producer, the refiner, the seller, the buyer and all users of petroleum products. In the interest of better and wider understanding of these properties and of the tests which are needed to determine them, we are summarizing the whole subject herewith. We believe that you will be interested in this "outline of oil-testing."

1—GRAVITY

This is the most important of all, since all crudes and all products from the densest asphalt to the lightest naphthas, are tested for it.

Throughout the oil industry gravity is expressed in "degree A. P. I. at 60° F." It therefore must be determined with an A. P. I. scale hydrometer, the reading of which must be corrected, because the oil is seldom at just 60°F. when you test it. Simple enough, but always make sure of the following essentials:

1. The official A. P. I. scale. This is simply the old Tagliabue scale—standard since oil-testing began.

2. Use a TAG standard A. P. I. combined hydrometer (Fig. 2). It embodies an accurate thermometer, and promotes confidence and precision.

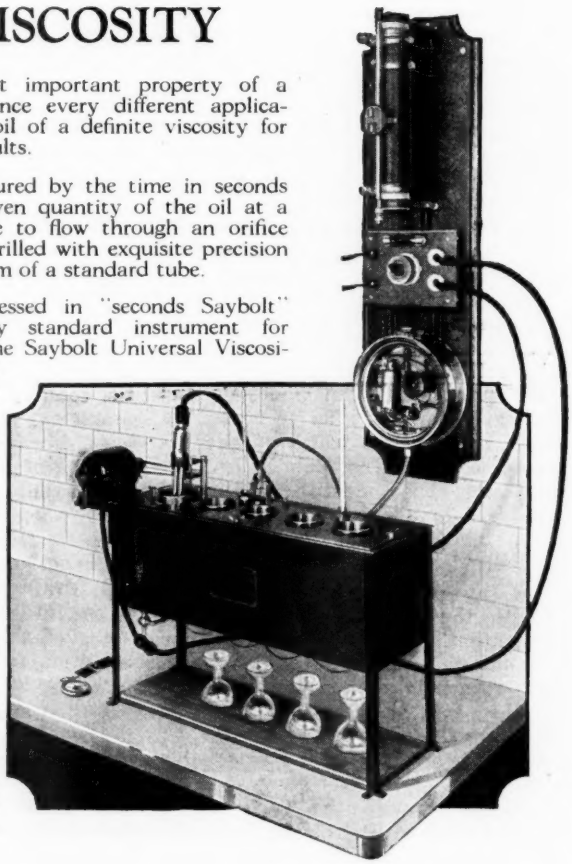
3. Avoid error by referring to the Standard Correction Tables in the TAG Oil-Testing Manual—the recognized authority.

2—VISCOSITY

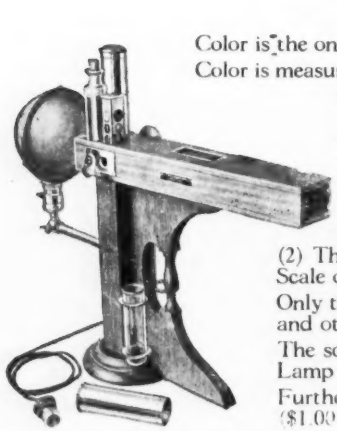
Perhaps the most important property of a lubricating oil—since every different application requires an oil of a definite viscosity for most efficient results.

Viscosity is measured by the time in seconds required for a given quantity of the oil at a given temperature to flow through an orifice of standard size, drilled with exquisite precision through the bottom of a standard tube.

Viscosity is expressed in "seconds Saybolt" because the only standard instrument for measuring it is the Saybolt Universal Viscosimeter, designed by the late George M. Saybolt and approved as standard by the A. S. T. M., the A. P. I. and the U. S. Government. The original Saybolt is manufactured only by this Company. We put it out in two models—one-tube regular form, or four-tube electrically heated and with automatic temperature control of bath. Both forms are described in Catalog N-699, a book that should be on your desk.



3—COLOR



Color is the one property that can be seen. Good color implies good quality.

Color is measured with instruments—in which a test sample and a comparison standard are observed at the same time through one eyepiece. The operator "matches" the two halves of his field of view and then reads the scale on the instrument.

Two color scales (and corresponding apparatus) are recognized in the oil industry:

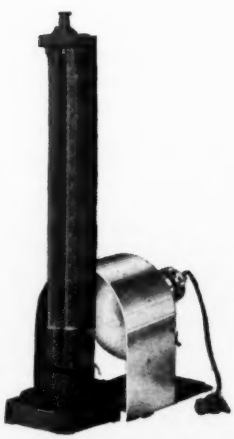
(1) The color of gasoline and kerosene is measured by the Saybolt scale on the TAG Saybolt Chromometer.

(2) The color of lubricating and other heavy oils is measured by the N. P. A. Scale on the Union Colorimeter and the TAG-Robinson Colorimeter.

Only these two scales have been adopted by the A. S. T. M., U. S. Government and other official bodies.

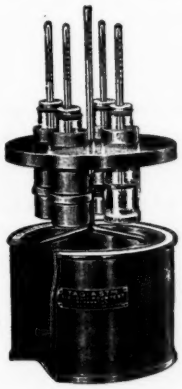
The source of artificial light is important, and the new (1927) TAG Daylight Lamp meets the most exacting requirements.

Further information on this and other standard tests in the TAG Manual ($1.00 plus postage) or in Catalog N-699 (free).



4—CLOUD AND POUR

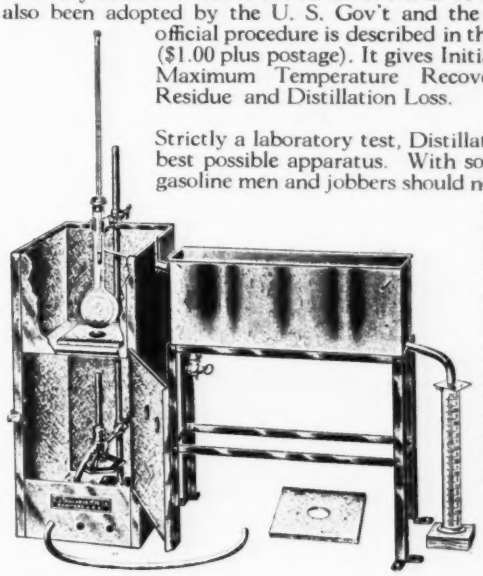
To the user, the "Cold Test" may be important only in cold weather; to the refiner and jobber, all year 'round. Each of the two divisions of this test is difficult to perform in a strictly scientific manner—even the expert laboratory man will not get uniform results unless he follows the standard procedure (removing and inspecting the tube for not more than three seconds every 2° F., or 5° F., etc. and uses the apparatus which conforms in every detail to the specifications. (A. S. T. M. D97-25T, U. S. Gov't 20.11) The TAG A. S. T. M. Cloud & Pour Test Apparatus is standard. Moreover, it is designed and constructed for maximum operating convenience, which makes for utmost accuracy. Four determinations can be made simultaneously and even with an inexperienced operator, disputes concerning specifications are ended.



The standard procedure is described in the TAG Manual ($1.00 plus postage); the apparatus in catalog N-699 (free on request—have you yours?)

5—DISTILLATION

This, today, is the one conclusive test of gasoline quality. Gravity is now known to be of secondary importance: Only by actually distilling gasoline can one determine its constituents that go to make a good internal-combustion engine fuel for summer or winter. The only standard test is the A. S. T. M. D-86-23T, which has also been adopted by the U. S. Gov't and the N. P. A. The official procedure is described in the TAG Manual. ($1.00 plus postage). It gives Initial Boiling Point, Maximum Temperature Recovery (distillate), Residue and Distillation Loss.



Strictly a laboratory test, Distillation requires the best possible apparatus. With so much at stake, gasoline men and jobbers should not rely on makeshift devices but use the recognized standard—the new TAG-A. S. T. M. Distillation Apparatus, a fine instrument with many conveniences that are worth investigating (Send for TAG Catalog N-699.)

6—CARBON RESIDUE

Lubricating oil has an annoying habit of creeping past the pistons of internal combustion engines, from the crank side to the explosion side. It does no good there, and as it burns it leaves a residue known as carbon. In order to determine the exact amount of carbon, one must actually burn a given quantity of lubricating oil under standard test conditions.

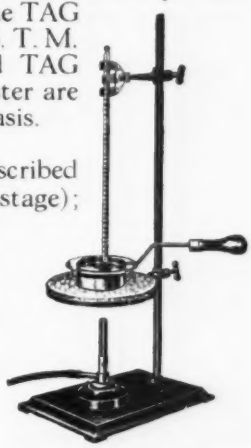
The only standard test is the A. S. T. M. serial D47-18, which has also been adopted by the U. S. Government, the A. P. I. and the N. P. A. The official procedure, which takes about a half hour, is described in the TAG manual ($1.00 plus postage). It is not a difficult test, but much depends upon the proper design and construction of the apparatus.

The TAG A. S. T. M. Carbon Residue Apparatus (Conradson Type) is built in accordance with the specifications. Its moderate cost frees you from the temptation of putting your trust in a cheap makeshift. Described in catalog N-699—free on request.

7—FLASH AND FIRE

Knowledge of the behavior of oil when heated is of the utmost importance to the industry. This test—one of the oldest known—indicates the exact degree of heat to which an oil may safely be subjected—before it gives off inflammable vapors.

Three types of instruments are standard and adopted by the A. S. T. M., U. S. Government, N. P. A., etc. They are the TAG Closed Tester, the Cleveland Open Cup Tester and the Pensky-Martens Closed Cup. This Company was the originator of the TAG Closed Tester—and the TAG A. S. T. M. improved Cleveland Tester and TAG A. S. T. M. Pensky-Martens tester are too well known to require emphasis.



The procedures are officially described in the TAG Manual ($1.00 plus postage); and the instruments themselves in Catalog N-699 (free on request). We illustrate the TAG Cleveland Open Tester which has lately been improved and with which oil men should become well acquainted.

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Marketing Policies of Big Oil Companies Are Root of Public's Distrust

By L. V. Nicholas*

Delivered before American Petroleum Institute Convention, Chicago, Dec. 5-8.

THE practice of the big oil companies in dumping their surplus gasoline on the market in competition with their own retail outlets is the one factor most responsible for the public's present attitude towards the oil industry, L. V. Nicholas, president of the Independent Oil Men of America, told the marketing session of the American Petroleum Institute at its Chicago meeting.

This gasoline dumped on the spot market encourages excessive retail competition because of the wide margins it offers distributors, he pointed out. It brings about duplication of marketing facilities, but it does not result in any lower price to the public for its gasoline. The big companies follow the uneconomic policy of rebating the big buyer—the most expensive customer to serve—and making the cash purchaser pay a penalty in a higher price.

The remedy, he said, was for individuals responsible for these policies to stop thinking as individuals and to think in terms of the industry and its relations with the public.

DOUBLE standards have no place in any sane, orderly line of industry, and are particularly inappropriate if they exist at the point of contact between that industry and the consuming public—where the finished product is exchanged for the public's cash.

A rough-and-tumble definition of what I mean by "double" standards is doing with your left hand something that casts discredit on your right hand,—in other words, selling to competitors with your left hand at a price that casts discredit on your right hand transactions with the consuming public direct.

Remember that the eye is quicker than the mind, and what the public see, or think they see, makes a very much greater impression than what they hear or read.

I have often wondered whether we attach sufficient importance to the fact that the point of transfer, where ownership changes hands, is always a point of friction in any industry; notably where labor is exchanged for cash or where transportation is exchanged for cash, and in any and all other lines where ownership is transferred for cash or its equivalent.

Our industry has what practically constitutes daily ownership transfer points of contact with one-fifth of our total population, and, of even greater importance, this ownership transfer intimately identifies us with the family budget of over half our population.

Ownership transfer constitutes the *entire* commercial phase of our business activities. I have been accused of having a "single track mind" because, over a period of years, I have insisted this subject was not receiving the attention of our industrial leaders it is justly entitled to.

Therefore, if you consider my views unduly biased, remember it is because in my opinion avoidable friction at our daily public points of contact is at the bottom responsible for all of the innumerable senatorial, congressional, and other investigations, regardless of the ostensible purpose for which they were called, as well as the wake of industrial demoralization and uncertainty that have followed them.

I am advocating today the same principles that have seemed to me the very primer of sound economics and merchandising practice in our industry, as well as in any other industries which have been forced by public statute or public pressure to adopt broad policies in their public relations because they would not do so of their own volition.

If we could reduce to a common denominator what we are all most interested in, the answer would probably be "commensurate and adequate profit."

If we can do something in a way that will give us larger returns and the risk is not proportionately greater, that is the way it should be done.

If you are willing to accept this as a true statement, what would you think of any one who deliberately set in motion market forces that would arouse public suspicion, create misunderstandings, and break down and neutralize his well laid plans for fair and commensurate profit?

What would you think of a manufacturer, so blind to adequate return on his invested capital, that for the sake of so-called "manufacturing efficiency," he disregarded the fundamental principles necessary to provide commensurate profit?

Our industry is fortunate, or unfortunate, depending entirely on which way you look at it, in that our general price structure is in very delicate balance to competitive offerings of equivalent products.

The value of anything is its value to others. This is an economic axiom and is one reason why no handler of reasonably good petroleum merchandise can get much, if any, premium for his goods over their actual value as compared with competitive offerings.

Gasoline and railway transportation are very much alike in this respect. You may prefer one route between Chicago and New York over all other routes, but if the time and the accommodations are reasonably similar, you will pay little, if any, premium to travel over your preferred route.

A GALLON of gasoline of your preferred brand, from your preferred source of supply, will take you little further or give you little, if any, greater satisfaction over the gallon supplied under a different brand, from a different source of supply; and no difference in performance is possible from the same brand of gasoline sold under a different name by any one of a myriad of middlemen.

The price of gasoline and other petroleum products is actually determined by market forces, or what we commonly term the "law of supply and demand"; and marketing machinery, regardless of how carefully and painstakingly set up, that attempts to retard or neutralize this economic force is foredoomed to a disastrous crash.

For the sake of "manufacturing efficiency" over-supplies of gasoline are created and dumped on a spot market where they come into direct competition with a fair and economically sound retail market at a price that promotes and encourages excessive retail competition by rea-

* President Independent Oil Men of America.

son of the wide margin of retail profit it offers.

The refiner, for "manufacturing efficiency", has released economic forces that tear down his fair and reasonable price structure, and has with his left hand done that which casts discredit and suspicion on his right.

Major and minor interests in the oil business have been throwing sound economics into the discard, counting on their ability to "out-luck" the other fellow and thereby tip the profit scale in their favor.

The total and complete repeal of all anti-trust legislation can not and never will replace the need for a working knowledge of manufacturing and merchandising economics and their reasonable practice in the oil industry.

The manufacturing division never can or will be able to operate to ultimate success in any industry without fair and reasonable consultation with the marketing division and an intelligent weighing of the public consequences of overproduction.

The oil industry has been subject to public criticism, not so much because the public misunderstand the industry, as because the industry has not devoted sufficient time and effort to understanding the public.

THE eye is quicker than the mind —the public see our price structure, our explanations are somewhat vague and unconvincing.

Why deceive ourselves with the idea that either more or fewer public statutes will replace industrial common sense? Let's look at our industry as the public see it.

Their principal and outstanding points of contact with us are through companies who produce, transport, and refine petroleum, and in turn sell the finished product at retail through their own owned or controlled retail outlets.

The tops and bottoms of our price structure read like the betting odds at a race track free-for-all, and to the average tourist—even within a limited area—it must look like a mangy, moth-eaten buffalo robe.

To what extent is our situation today much different from what it was back in 1923?

In that year discussions within our industry of our price structure assumed perhaps their most heated stage. Even the middlemen, enjoying wide margins of profit that spot dumpings created for them, were beginning to fear the ultimate result of the tremendous duplication of retail marketing facilities that increased their overhead to a point where even a wide gross margin meant no net profit.

In that year, the price structure to the public at retail was based on approximately 12 cents per gallon f.o.b. refinery, while the spot market was 8 cents or thereabouts.

In other words, it was possible for a gasoline buyer in tank car lots to purchase gasoline from practically any of the companies operating their own retail stations, at a price that branded their retail price structure as exorbitantly high and entirely unjustified.

The refiners running more crude than their retail outlets required were about to reap the economic whirlwind of the very forces they had released by setting "manufacturing efficiency" paramount to merchandising sanity and declining to consider that most important phase of their operations —the public point of contact.

THE industrial debacle starting at that time has gone into history and needs no comment of mine.

The question is: With all this past experience, have we learned our lesson, and are we prepared to profit by it?

Let me give you a typical example of one phase of our price structure today. A great company, whose operations are national and international, is selling today with its left hand to jobbing competitors at a price that is recognized on every hand as from three-fourths of a cent to a cent less than the actual cost to produce the gasoline, based on the posted price of crude.

At these outlets they fix a price; and as long as no suspicion of the fairness of this price attaches to it, the public are satisfied. The automobile is undoubtedly a great public convenience and economic necessity. But millions of them are owned by those who, willingly or unwillingly, forego certain other conveniences or creature comforts in favor of automobile ownership. Millions are purchased not out of capital reserves, but bought and paid for out of the current family budget.

In many cases the initial payment takes the last dime from the savings account, and it requires pinching to keep up the monthly installments. After the first payment has been made and the first joy of ownership has receded and the car has become accepted as a family fixture, every time it turns a wheel, the oil industry must of necessity go into that family purse for the commodity that makes wheel-turning possible.

If we agree that the point of friction in any industry is the point of contact where ownership changes hands, consider the strain to which our price structure is subjected when once, twice, or three times a week it is the basis on which we make public points of contact.

Even with a perfect price structure, there would always be a tendency to friction capable of developing into irritation.

Now here you have our industry, in practically daily points of contact with one-fifth of our population, intimately identified with the family budget of over half our population, dumping on the spot market quantities of gasoline that go into channels of retail merchandising that multiply the opportunities for the public to buy, without apparently lessening the price at which they buy, except under duress and compulsion.

This same company is in direct competition with the jobber to whom it is selling, and its price to its consuming public in the same territory is from two to three cents per gallon higher than its tank car price justifies.

Let us look at this same situation from another angle. The jobber to whom it is selling tells me that the price he obtains from this company —which is his direct competitor—is so much lower than the price at which he can buy elsewhere that it actually means an added profit to him of approximately $10,000 per month.

He tells me he is taking this extra $10,000 and adding $5,000 each month out of his regular earnings and using the money to build new bulk and service stations, in territories already groaning under the overcompetitive load.

One more illustration of double standards. Throughout the length and breadth of the United States we deal directly with the consuming public through our own service stations, in which our capital is invested, and set up right next door to these stations retail outlets to which we guarantee a margin of profit that enables them to sell in competition with us, and the margin we guarantee is not only all that we consider necessary to operate our own service stations, but we go a step beyond that.

At our own service stations we have to figure—out of the margin we allow ourselves—interest and depreciation on the equipment of that station; whereas to this competitive outlet we not only furnish free of charge the necessary equipment to sell in competition with us, but in many cases go a step further and lend him—without interest—the working capital to conduct his business.

NO refinery can continue the practice of running 25 per cent more crude than it properly should, with the expectation that it can dump the surplus on the spot market and not arouse public suspicion and contempt of its retail price structure; and a consistently maintained system of this kind will continue to multiply and support the uneconomic competitive outlets and keep alive the flame of public hostility and suspicion.

All efforts to adjust marketing conditions to a price structure of this description, without reducing proportionately the retail price to the consuming public, will always arouse public suspicion and criticism, and

it is not satisfactory to the public to be told that they have received the benefit of this wide margin in the form of gloriously beautiful, architecturally ornate service stations on practically every corner lot throughout the length and breadth of the land.

Let me hasten to explain that I am familiar with many of the reasons—and in part agree with them—that prompted the maintenance of a retail price through company owned service stations that was in line with fair cost to produce gasoline, and I recognize the fairness of the claim that any price less than that was out of line with fair and proper cost of production.

BUT, between the choice of reaping the whirlwind of public doubt and suspicion as the result of overbuilding and needless duplication, the result of permitting these wider margins to exist and the cost of reducing retail price to hold it in line with the wholesale price, I still contend that the lesser of the two evils would have been, and is, orderly reduction to the public.

I have witnessed with a great deal of regret the expenditure of vast sums in advertising appropriations to establish public recognition for the quality and performance of a trademarked brand of gasoline, only to see the brand, when once established, toppled from its pinnacle of superiority to wallow in the slime of some competitive price gutter with the bastard brand of a small and unknown competitive claimant for public recognition.

This type of sales policy is neither convincing to the public nor profitable to the industry. It never has been and it never will be.

Imagine you are an average business man, not interested in the oil industry except as you come into contact with it in the purchase of supplies of gasoline for your automobile.

In the ordinary range of your travels with that car, on business or pleasure, you can and do come into contact with the widely advertised trade-marked brands of great major companies, that vary in price from one to as high as eight or ten cents per gallon from your home town price, with no explanation for the apparent favoritism shown some localities, except that some semi-heroic individual had cut the price and shown the profiteers where to head.

Is it any wonder that Mr. Average Business Man is willing to encourage some "Hero" to start the type of competition that will enable him to buy his favorite brand of gasoline for from one to ten cents less?

Double standards can not, do not, and will not pay. They arouse suspicion and they build resistance that it is difficult, if not impossible, ever to overcome.

The oil industry today has easily 50 per cent more retail outlets than the volume of consumer gallonage can possibly justify, and the resulting overhead is a burden on the industry, as well as the public.

I believe, and always have believed, that the legitimate independent branch of the oil industry can stand up equally well and just as successfully as any other branch of the industry in any sound, tho possibly painful, economic readjustment.

Theoretically and practically, the public will not consent to any system of marketing that deprives them of what they believe to be the advantages that keen competition and oversupply are supposed to provide.

The public are not content to put up with marketing practices that, while they reduce net margins of profit, bring about an operating overhead that prevents the public from enjoying a reduction in price.

Any intolerance of and objection to the oil industry and its methods is broadly based on the belief that our price structure carries extravagant profits to the retail or jobbing branch of the industry, while we combine—in so far as posible—to prevent any part of this margin going to the public in the form of lower per gallon cost.

A system of special discounts and inside price structures, as is prevalent within the industry at this time, is very dangerous and must go by the board.

The average man who pays cash and gets out of the way until time to make his next purchase is by all odds our best customer, and furnishes our greatest total gallonage.

And yet, this, our most profitable buyer, who requires of us the least overhead to serve, is under our present system penalized to an extent that in my opinion is little short of industrially criminal, and the profits we gain from him are largely dissipated in rebates and concessions made to our most unprofitable type of customer.

WE keep books, carry charge accounts and employ a vast array of checkers and counter-checkers to maintain a double standard and pay rebates to so-called "large buyers" where, per unit sale and operation, overhead is greater and the theoretical saving of sales solicitation is very largely a preposterous myth.

Has this industry totally and completely forgotten the example of the railroads and their experience in the matter of preferred and special customers for transportation rates, and the whirlwind of public suspicion and legislation which resulted from the practice, and are we going to continue these marketing practices in the oil business with utter disregard for sound economics and public policy?

Remember, the railroads dealt in transportation,—and to the public, gasoline signifies another form of transportation; and the railroads had preferred and preferential customers who received rebates and various and sundry prices for transportation, and Mr. Average Man—who constituted the bulk of the travel—paid the full and going rate.

In practically all of its fundamentals, the railroad analogy applies to the problem confronting us.

The railroads dealt with the public en masse—so do we; and the railroads forgot that the spotlight-loving politician, as well as the earnest and sincere public servant, is activated very largely, if not entirely, by mass opinion and viewpoint.

We are getting Mr. Average Buyer out of patience with and intolerant of our system of retail marketing, and Mr. Average Buyer is by far our best customer; and from a standpoint of numbers he makes and breaks public sentiment and political parties.

If we are going to be understood by the public, our first step is to understand ourselves, and then try to get in step with the public.

As individuals, we have gone our own gait too long—we must begin to think in terms of industry and how our activities as individuals will affect that industry.

Make Pleas for Adequate Research Funds

CHICAGO, Dec. 8.—Two pleas for adequate working funds were made at the fundamental research session of the American Petroleum Institute technical group by Hugh S. Taylor, chairman of the central petroleum committee, National Research Council, and Dr. Frank C. Whitmore, professor of chemistry at Northwestern university. Both referred to the sum of $100,000 at the disposal of workers on fundamental research as too small to permit maximum results.

"In spite of this," said Dr. Taylor, "the committee has succeeded in securing the services of a certain number of able fellows whom it proposes to retain as long as they are willing to serve. For the funds available the program may have been too broadly spread to obtain the maximum good.

"That is worth consideration. The problems studied may not be those requiring the most urgent solution. It is for these reasons that we come before you today. You are the professional men in this problem. It is largely your problem, as well as ours. It is your responsibility as well as ours that the research program shall succeed. For the industry needs, more today than ever before, a fresh stream of fundamental scientific studies, which it can translate into technical operations and procedure to the better conservation and utilization of its limited raw material."

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Staff Special
CHICAGO, Dec. 8

HARRY D. FRUEAUFF, vice president of Henry L. Doherty & Co., recommended to oil companies cutting off half or three-quarters of their sales department expenses (including advertising and pay roll) for 1928 and spending it collectively to develop new uses for oil. And to show about how such a work might proceed he enumerated certain fields of endeavor which might be attacked first.

At the time Mr. Frueauff was delivering this address to the first marketing conference of the American Petroleum institute, directors were listening to D. E. Buchanan of Chestnut & Smith Corp., emphasizing the need of expanding the oil industry's market. As a result the directors created a committee of five headed by Mr. Buchanan to seek new markets for oil products and devise means of supplying them.

"In almost any other industry," Mr. Frueauff said, "the production and purchase of raw materials for the manufacturing department depend almost exclusively on the estimates of executives of available markets. Their activity begins with creation of new uses and promotion of greater consumption. But the petroleum industry has not been operated under this economic law. Its major demand has been created by others. Their efforts have been concentrated on competitive effort to take on the business created by others. It is my firm conviction that there is no reason why oil prices should have taken the big slump they did this year and comparable years in the past.

"Had the oil companies, one and all, on Jan. 1, 1927, released from their sales organizations, as now constituted, every salesman; had they dropped from their advertising and promotion appropriations every dollar that they had planned and did spend in an effort to sell competing products, and devoted their effort to the promotion of new uses for petroleum products, in my opinion gasoline would be selling for just as much today as it was ten months ago.

"The reason gasoline is cheap today is not because of overproduction, as is easily proven by statistics, but because the oil industry is apparently being run as a charity organization. By their own competitive methods of taking business from the other fellow, the oil men have gradually broken down the price structure until it is unprofitable and carrying with it diminished prices on all other products from a barrel of crude. They not alone have broken down the price, but they have paid an enormous price in doing it through sales and advertising expense, investment in pumps and locations, and duplicating, time and again, facilities that are unwarranted.

Will anyone deny that if every salesman was taken off the road or off the street, as I stated, there would not have been as much gasoline or motor oils consumed? With cut-throat competition eliminated would not each of those products have brought a better price?

"By far the largest potential opportunity to increase the consumption of petroleum products is through a more extensive and a much more concentrated campaign to heat as large a proportion of the homes of America as possible with distillates and fuel oil. According to a recent survey of the United States there are over 15,500,000 homes wired for electricity. Discarding those homes located in sections where climatic conditions do not require its use or where especially cheap coal and exceptionally cheap natural gas is served, a large potential market is still left.

"DOMESTIC oil heating in America is scarcely seven years old, yet in that time it has advanced six times as far as the automobile industry during the first ten years after the appearance of the first practical 'horseless carriage.' Sales of oil heating equipment last year amounted to over $75,000,000. This year sales promise to pass the hundred million mark. The 25 million homes of America offer to the industry an almost unlimited field of expansion.

"A thorough study of the many possible ways in which the situation can be improved must lead one to the acceptance of two fundamentals as regards the future of the oil burner industry. (1) The oil burner must be merchandised by an organization. (2) That organization should undoubtedly be an oil company.

"The general price of oil burners today is entirely too high and it is believed that in many cases where the equipment is sold in large quantities through the larger oil companies it is possible to reduce the selling price several hundred dollars.

The oil burner offers a tremendous potential market. The gross revenue that can be obtained from a home owner is twice as much as that usually obtained from the sale of gasoline. The average home owner of an automobile uses about $100 worth of gasoline per year at 20 cents per gallon. The average home owner using oil for heating purposes will consume 2,000 gallons per year at 10 cents per gallon, or a gross revenue twice greater than that obtained from the sale of gasoline.

"THE oil company in merchandising oil burners is in a better position to secure a definite part of the business available and with less competition. In selling an oil burner the oil company can make proper contract arrangements with the customer to supply him with oil and thus eliminate to a marked degree the problem of competition from other companies.

"I had the privilege a few weeks ago of going over quite a comprehensive study of the possibilities of aviation in the United States.

"As the outcome of this detailed study of aviation the authors state as their opinion that by 1950 there will be in the United States at least 1,000,000 aeroplanes in commercial and military service. This means that while today there is one aeroplane, military or otherwise, to every 15,000 people in the United States, by 1950 there would be one to every 150 people. The estimated consumption of gasoline in 1950 from this source alone figures out 1,000,000,000 gallons and 100,000,000 gallons of lubricating oil. This is one industry that the oil industry as a whole and the companies individually should promote immediately.

"Lloyd's Registry of Shipping for 1927 shows that in the entire world there are something over 63,000,000 gross tons of ships operating. Of these, 18,500,000 are oil burning steamers and 4,270,000 are motor ships, so that today 36 per cent of the marine operators are already using oil for fuel.

In addition to these, Mr. Frueauff enumerated and spent some time outlining the possibilities of a half dozen other potential markets which he considers only partially worked. They were road building, scenic tours by automobile, bus and truck development, the farm, foreign consumption and the specialized naphtha consuming trades.

Uniformity in Side Track Agreements Is Desirable for Oil Industry

By J. C. Irwin*

Presented before American Petroleum Institute meeting at Chicago, Dec. 5-8

MOST railways have a standard form of industry track agreement used in dealing with industries on their line but there is a lack of uniformity in these individual standard forms which leads to complications when comparisons between them are made. The situation is especially embarrasing to large industries, such as those represented by the American Petroleum Institute, operating throughout the country and dealing with many railway companies.

It is recognized that differences in the Public Utilities acts of the various states or local court decisions influence the situation to some extent. It is also recognized that special conditions under which some industry tracks are built require special provisions. However, it may be noted that agreements often attempt to cover in detail, provisions which would better be omitted, for the reason that the very recital of detailed items indicates that other items of similar character not mentioned were purposely omitted. It is impracticable to foresee and cover in detail, every contingency that may arise. This is being recognized in the tendency toward shorter forms with concise but comprehensive provisions. Any form to be endorsed as a standard must follow those lines.

Recognizing the right and duty of every manager to protect his interests, it is hoped that their minds may be brought together through the work sponsored by the American Railway Association so that a basic, universal

*American Railway Engineering Association.

Proposed Form of Sidetrack Agreement

Adopted 1923

THIS AGREEMENT, made this .....day of .....19.....between ..... hereinafter called the Railway Company, and ..... hereinafter called the Industry;

WITNESSETH,

WHEREAS, the Industry desires track facilities, hereinafter called sidetrack, for the economical and convenient conduct of the business of the Industry, at or near..... Station, County of ....., State of ....., described as follows: in accordance with plan numbered ..... dated ....., designated as ....hereto attached and made a part hereof; and

WHEREAS, the operation of cars and engines over said sidetrack at other than the regularly established station facilities of the Railway Company, involves the risk of damage to or destruction of property and injury to or death of persons;

NOW, THEREFORE, in consideration of the covenants and agreements herein contained, it is mutually agreed that the said sidetrack shall be constructed and maintained, and the Railway Company hereby agrees to operate the same under the following terms and conditions:

RIGHT-OF-WAY.

1. The Industry shall provide, without cost to the Railway Company, all necessary right-of-way outside of the right-of-way of the Railway Company, required for the proper construction and operation of said sidetrack, said right-of-way to be satisfactory to the .....of the Railway Company.

The cost and expense of procuring or complying with any ordinance, order, permit or consent whatsoever required by Municipal, State, or other lawfully constituted authorities for the construction, maintenance, operation and use of said sidetrack shall be borne by the Industry.

The Railway Company shall have the right to enter upon the property of the Industry, for the purpose of constructing, maintaining and operating said sidetrack.

CONSTRUCTION.

2. The cost of constructing said sidetrack, including roadbed, trestles, bridges and all other appurtenances in connection therewith, shall be borne as follows:

MAINTENANCE.

3. Said sidetrack shall be maintained (including removal of ice and snow) and renewed to the satisfaction of the ..... of the Railway Company; the work shall be performed and the cost thereof borne as follows:

OWNERSHIP.

4. The title and ownership of said sidetrack shall be vested as follows:

USE.

5. The Railway Company shall have the right to use, without cost, the whole or part of said sidetrack for general railway purposes, provided such use shall not unreasonably interfere with the use thereof by the Industry.

The Industry shall not permit or authorize the use of said sidetrack by or for the benefit of any other person, firm or corporation not one of the parties hereto, nor assign this contract or any right thereunder, without the written consent of the Railway Company.

CHANGES OR ENLARGEMENT.

6. If any change, rearrangement, extension or enlargement of said sidetrack or its structures shall at any time be required by reason of any change in the Railway Company's track or tracks, or because of any changes in the operating practice of the Railway, or for any other cause, the Railway Company shall not be required to bear any expense resulting therefrom.

CLEARANCES.

7. The Industry agrees not to permit any obstruction over said sidetrack, less than..... feet above top of rail, or alongside of said sidetrack less than.....feet from center of track, with the necessary additional clearance on curves.

LIABILITY.

8. The Industry agrees to indemnify the Railway Company and save it harmless from any and all claims and expenses that may arise or be made for death, injury, loss or damage, resulting to the employes or property of the Railway Company or to the employes or property of the Industry or to any other persons or property upon the premises of the Industry by request or consent of the Industry, whether by fire or otherwise (except where it can be shown that such death or injury to persons was due solely to negligence on the part of employes of the Railway Company), arising out of the construction, maintenance, use or operation of said sidetrack for account of said Industry.

DISCONTINUANCE.

9. Any and all loss or damage sustained in consequence of any temporary or permanent elimination of said sidetrack, shall be assumed by the Industry, or in event the disposition of the property of the Railway Company, or its future use or development shall make it impracticable in the judgment of the..... .....of the Railway Company to continue the connection, the Industry hereby waives any and all claims therefor.

CANCELLATION, TERMINATION AND REMOVAL.

10. This agreement shall be terminable upon .....(.....) days' written notice from either party to the other.

Upon termination of this agreement the Railway Company shall have the right to enter upon the property of the Industry and remove any or all of the material owned by the Railway Company, and shall not be liable to account in any way to anyone for any moneys paid or expended on account of any of the track or tracks covered by this agreement, nor for any damages resulting from the removal of any or all of the material owned by the Railway Company.

Until terminated as hereinbefore provided, this agreement shall inure to the benefit of and be binding upon the parties hereto, their heirs, executors, administrators, successors and assigns.

IN WITNESS WHEREOF, The parties hereto have executed this agreement in ..... the day and year first above written.

Witness for Railway Company:

.....

.....
Railway Company

By .....

Witness for Industry:

.....

.....
Industry

The "N.I.T. League Liability Clause"

"It is understood that the movement of railroad locomotives involves some risk of fire, and the industry assumes all responsibilty for and agrees to indemnify the railroad company against loss or damage to property of the industry or to property upon its premises, regardless of railroad negligence, arising from fire caused by locomotives operated by the railroad on said track, or in its vicinity for the purpose of serving said industry, except to the premises of the railroad and to rolling stock belonging to the railroad or to others and to shipments in the course of transportation.

"The industry also agrees to indemnify and hold harmless the railroad company for loss damage or injury from any act or omission of the industry, its employes, or agents, to the person or property of the parties hereto and their employes, and to the person or property of any other person or corporation, while on or about said track; and if any claim or liability other than from fire shall arise from the joint or concurring negligence of both parties hereto it shall be borne by them equally."

standard form of industry track agreement will come into general use.

During the twenty years of its existence, Committee XX of the American Railway Engineering association, has prepared many forms of contracts, leases and agreements for various purposes, which have been adopted as standard by the association and printed in its book of recommended practice.

These standard forms are conspicuous for the simplicity of their composition. The terms are stated in English so plain that it cannot be misunderstood. The aim has been to see that the correct word is used in every place and that each clause clearly conveys the meaning intended. Concise forms have resulted.

This Committee started the preparation of a Standard Form of Industry Track Agreement in 1915 and in order to review current practice, it collected 58 different forms from railways operating over 100,000 miles of line. After three years of study and the issuance of tentative forms for discussion, the first standard form of the A.R.E.A. was adopted in 1918.

One of the regular assignments of this committee is to scrutinize and review its own work and in 1923, a revised form, recommended by this committee, was adopted by the Association. This is the form which was presented to your committee of the American Petroleum Institute when we first met in conference.

Some railways use this A.R.E.A. form complete; others use it with minor changes, but in many cases, where the main structure of this form is used, the Liability provisions, known as the "N.I.T. League Clause" is substituted for Liability Section 8 of the A.R.E.A. form. It is understood that this situation prevails by reason of this "Clause" having been acceptable to representatives of the National Industrial Traffic League as well as to representatives of the Association of Railway Executives, in a conference held in 1920.

This Committee of the American Railway Engineering Association has given earnest consideration to the suggestions made by your Committee of the American Petroleum Institute. It is prepared to recommend some changes but it does not depart from the principle that there are special conditions and added risks in connection with the service on industry tracks as compared with service on the carrier's general delivery tracks.

In connection with oil sidings in particular there is question as to what should be written into an agreement to cover protection against stray current, including reference to insulated joints, bonding and grounding, not only in electrified territory but on all oil sidings. Just how much this can be standardized is a question, but the Committee in charge of standard forms of agreement will not attempt to write in engineering construction specifications.

Use Posters to Educate Workers On Standard Equipment

Staff Special

CHICAGO, Dec. 8

CODES on recommended field practice, which have been completed by a majority of the American Petroleum Institute standardization committees, are to be given broad circulation in the coming year for educational purposes. In addition, the standardization division at Dallas, in charge of Carl A. Young, will be advertised to the field workers through posters illustrating the advantage of using A.P.I. standards. It is contemplated that such posters will be used in field warehouses and derricks, where a better contact would be brought about.

The thought was developed at the general standardization committee meeting that a plan should be developed whereby these posters could be sent to various oil companies and possibly issued to them as field orders, the details of this suggestion to be worked out later. It was recommended, however, that one poster illustrating the scope of the A.P.I. standardization program be put in general circulation at the earliest possible moment.

It was also agreed by the general committee to change the specifications handbook to approximately letter size, this being regarded as especially desirable because of the codes requiring larger illustrations than would be possible to handle advantageously under present conditions.

Representatives of three major lumber associations were put on a subcommittee of the standard rigs and derrick group undertaking classifications, or specifications, for wood that will give the large lumber manufacturers an opportunity to come into the petroleum industry picture with other woods than those used mostly in the past. Their report will not be ready for some time. Representatives of the National Lumber Manufacturers Association, the Southern Pine Association and the West Coast Lumbermen's Association will take part in this work.

Work of the rotary drilling equipment committee, Ernest J. Nicklos, the Texas Co., Tulsa, acting chairman, included the voting out of the standards of the A.P.I. sprocket tooth form which had been found unsatisfactory. This resulted from an investigation of manufacturers and the engineering sub-committee.

Wire rope specifications were adopted as final by the committee presided over by C. C. Scharpenberg, chief production engineer, Standard Oil Co. of California. The Oklahoma district committee dissented to final adoption, but was out-voted.

The steel storage tank committee, Ralph J. Reed, chief engineer, Union Oil Co. of California, presiding, approved with minor revisions the general specifications issued in mimeograph form as A.P.I. standards No. 12, last July. The committee also proposed proceeding with a study of tank accessories.

A cable drilling tool joint code was presented to the committee by George H. Jaques, chairman of a special committee on its preparation. This code was accepted and will be circulated throughout the membership of the committee for suggestions and advice with the idea in mind of adopting it finally at a standardization meeting to be held in Colorado Springs next June.

F. J. Hinterliter, of the Hinterliter Tool Co., chairman of a special committee, submitted three smaller sizes of joints that the cable drilling tool joint committee considers will meet the requirements for small sizes. Thomas Fleming, Jr., of the Oilwell Supply Co., Pittsburgh, is National chairman of the cable drilling tool joint committee.

The following additions were made to present specifications for boilers, of which committee S. J. Dickey, General Petroleum Corp., Los Angeles, is chairman: (1)—standard dimensions of hand hole openings; (2)—design of stack flanges; (3)—location of pressure gauge opening; (4)—several internal clearance dimensions.

H. W. Fletcher, chief engineer, Hughes Tool Co., Houston, reported as chairman of a special A.P.I. correlating committee on gaging and gaging practice that master gage for sucker rods with monogram will be available to the public early in 1928.

Important but routine work was carried forward by the tubular goods committee, presided over by Charles Fitzgerald, Pure Oil Pipeline Co., Dallas; rig irons committee, H. J. Lockhart, Parkersburg Rig & Reel Co., Parkersburg, W. Va.; pumping equipment committee, T. E. Swigart, Shell Co. of California.

KANSAS CITY, Dec. 10.—Butler Mfg. Co., in an effort to create something new and attractive in ready-made filling stations, has built what it calls its "de luxe" filling station of steel. The roof is steel tile and walls are steel drop siding. Back windows are steel casement sash and windows at the front and sides are stationary mounted in a copper frame.

Canopy and office are equipped with steel ceilings and office walls are finished with composition lining.

Net Income, No Deductions To Be Made, A. P. I. Plan

Staff Special
CHICAGO, Dec. 7

A NET income item complete in itself, without deductions to be made, is the outstanding feature of the income statement approved by the board of directors and by the committee on uniform methods of accounting at the American Petroleum Institute here Dec. 5 to 8. With this item showing absolute net income, that is with every oil company adopting the approved form, the investing public has a basis of comparison for these company's net income statements.

The uniform balance sheet was finished a year ago, the committee's first great accomplishment, and approved by the general committee and by the board of directors at the Tulsa meeting of the Institute. Now it is being used by a number of the bigger oil companies. Others are installing it and stock exchanges have expressed their approval of it.

Work of accomplishing uniform methods of accounting will proceed next year with much the same machinery used in the past. Some committee members had wished the American Petroleum Institute would create a special division but the board of directors ruled unfavorably on it Wednesday.

The committee will be smaller next year than ever before. It has been reduced to ten members, chiefly because a small committee is more wieldy and can do more work with less expenditure of time, money and energy. The large committee was necessary in the early stages of the work which consisted chiefly of collecting information from as many sources as possible and selecting the best ideas from all.

CLASSIFICATION and analysis of detailed refinery costs constitutes the work immediately in hand. When that has been done, much the same thing must be undertaken for the marketing branch. Probably the two tasks will be worked concurrently part of next year.

The committee members appointed by E. W. Clark, president of the A.P.I., to work with M. W. Mattison in charge of the Institute Committee for another year composed of five regional members and five members at large, are H. F. Davis, Standard Oil Co. of New Jersey, New York City, for the eastern division; F. S. Reitzel, Sun Oil Co., Philadelphia, for the Appalachian division; George F. Winters, Phillips Petroleum Co., Bartlesville, Okla., for the Mid-Continent division; Ira McFarland, The Texas Co., Houston, for the Texas-Louisiana division, and George H. Forster, Union Oil Co. of California, Los Angeles, for the western division.

Members at large are H. A. Gidney, Gulf Oil Corp., Pittsburgh; B. W. Letcher, Standard Oil Co. of California, San Francisco; C. H. Jay, Pure Oil Co., Chicago; George F. Smith, Continental Oil Co., Denver; Paul R. Jones, H. L. Doherty & Co., New York City, and M. W. Mattison, American Petroleum Institute, New York City. The committee had a special meeting in Chicago to organize its work for next year.

The headline speaker in the Wednesday forenooon was Prof. Roy Kester, Columbia university, whose subject was "Cooperation Between Executives and Comptrollers". The comptroller's big job is in management rather than in bookkeeping, the speaker pointed out, in fitting the accounting system to the men in the business as well as to the operations of the business. A good comptroller should be able to point to any executive in the organization at the end of a fiscal year and say that man has accomplished certain specific things and it has cost the company exactly so much money.

"Machine Handling of Accounts Payable" was the subject of George H. Forster, Union Oil Co. of California. He discussed the needs and advantages of machine speed and accuracy in all the performances of the accounting department, especially those in the accounts payable branch which involves the issuance of all checks. And he related in detail how it is done in his organization.

"Problems of Oil Refining and Marketing Costs", by R. D. Matthews, Union Oil Co. of California, read before the A.P.I. meeting in Fort Worth in 1924 was presented to the committee's afternoon session again by Mr. Matthews in response to request.

M. A. Chambers, Panhandle Refining Co., read a paper on "Realization Methods in Refining Costs". It caused much comment, having special bearing on the task the committee has set about to accomplish in 1928. "Gasoline Taxes in Accounting" was discussed briefly by George F. Smith of Continental Oil Co.

Mr. Smith's recommendation to the industry is to report gasoline taxes separately as a foot note in published statements of oil companies. "The information is being given the public already in daily papers and trade journals", Mr. Smith said, "and what benefit are we to derive from the publication of such information."

Net Income Statement

INCOME ACCOUNT

Gross Operating Income		$000,000
Operating Charges:		
Costs, Operating and General Expenses	$000,000	
*Taxes	$000,000	
Intangible Development Costs	$000,000	
Depletion and Lease Amortization	$000,000	
Depreciation, Retirements and other Amortization	$000,000	$000,000
Net Operating Income (Loss)		$000,000
Non-Operating Income (Loss) (Net)		$000,000
Income (Loss) Before Interest Charges		$000,000
Interest Charges:		
Interest and Discount on Funded and Long-Term Debt	$000,000	
Other Interest	$000,000	$000,000
Profit (Loss) for Period		$000,000
Profit (Loss) Applicable to Minority Interests		$000,000
NET PROFIT (Loss) Accrued to Corporation		$000,000

*In addition to the amount of taxes shown above, there was paid (or accrued) for State gasoline taxes the sum of $.....

EARNED SURPLUS ANALYSIS

EARNED SURPLUS—Beginning of Period		$000,000
Adjustments of Earned Surplus (Net)		$000,000
Net Profit (Loss)—Current Period		$000,000
TOTAL		$000,000
Dividends on Preferred Stock	$000,000	
Dividends on Common Stock	$000,000	
Stock Dividends (Specify)	$000,000	$000,000
EARNED SURPLUS—End of Period		$000,000
Less: Earned Surplus—Appropriated		$000,000
EARNED SURPLUS—Unappropriated		$000,000

Four Subjects Given Out For A.I.M.M.E. Meeting

TULSA, Dec. 8.—Four subjects have been announced, and the complete program will be given out in several weeks, by the committee in charge of refinery engineering meeting of the American Institute of Mining and Metallurgical Engineers in New York Feb. 21 to 23. Walter Miller, Marland Refining Co. is chairman of the committee, and associated with him are Dr. T. G. Delbridge, Atlantic Refining Co.; Herschel G. Smith, Gulf Oil Co.; and C. W. Stratford, Tide Water Associated Oil Co.

"Sources of Automobile Fuel" is a paper being prepared by Frank A. Howard and Prof. R. T. Haslam, Standard Oil Development Co. "Modernization of the Cylindrical Still" is C. W. Stratford's subject. "The Role of the Combustion Engineer in Refining" is the subject of Joseph W. Hays, who has been solving combustion and heat conservation and power plant problems at the Mid-Continent Petroleum Corp. at West Tulsa.

An innovation in the program for many refiners not in close touch with courses of raw material the committee announced will be a paper on "Modern Technique in Petroleum Production" by F. Julius Fohs, geologist.

Unfair Assessments Run Up Tax Bill for Marketers, Says Expert

Staff Special
CHICAGO, Dec. 8

LACK of study by oil marketing companies of their tax problems, and particularly lack of co-operation among companies in the same territory is running up the unjust tax burden the marketing industry carries every year, F. E. Packard, Chicago, general and tax attorney for the Standard of Indiana, told the American Petroleum Institute Group Session on Taxation. Mr. Packard talked on "State and Municipal Taxation."

As one illustration Mr. Packard pointed out that, out of 9,000 taxing districts in which his company filed assessment schedules, from hundreds come complaints that the company's assessment has been increased because of the filing of excessive schedules by other members of the industry.

"The reason for this extraordinary state of affairs is not that our valuations are filed too low," stated Mr. Packard. "As a matter of fact I know of no place in our territory where our valuations are less than the average valuation of the property in the taxing jurisdiction. By careful survey we attempt to arrive at a composite ratio of the assessed to the actual value of all property in a taxing district and file our property at the same ratio. We are seldom, if ever, permitted to do this but must submit to a valuation above the average of our neighbors. No great corporation can hope for as favorable a ratio as property owners generally.

"Into this peaceful scene comes some other member of the industry who has paid little attention to assessment and taxation either general or in that particular locality and files values for assessment purposes without regard to the ratios of assessed to actual value which prevail. This sort of thing costs the company tens of thousands of dollars annually. The industry as a whole does not seem to remember that state laws and constitutions, printed in leather bound books, after due passage by legislative bodies, and requiring 100 per cent assessment are not binding upon property owners unless they are generally enforced; that no citizen can be required to pay upon a greater percentage of assessed to actual value than generally prevails in his taxing jurisdiction."

Mr. Packard explained that it is his company's policy to file valuatioins at the prevailing ratio of assessed to actual value in every taxing district in which it operates. If there is an increase of $300 or more in any schedule so filed, it must be reported by the field man to the general office and a protest made to the assessing official or board making the increase.

In merchandise and other taxable items also improper reports are constantly being filed whereby the corporation is paying in excess of the amount contemplated by law, Mr. Packard said.

"Take the specific item of merchandise," he said. "Unquestionable illegal assessments under this head alone burden the industry with a sum which could not be enumerated with less than six figures. Compilations of merchandise inventories as returned to rating houses as contrasted with the returns for purposes of assessment reveals that 25 per cent of assessed to actual value is high average ratio for any taxing jurisdiction. As a rule the ratio hovers around the 10 per cent mark. I am satisfied that there is no member of the industry which maintains a ratio as low as 25 per cent of assessed to the actual value of its merchandise, and many are returning as high as 80 per cent of actual valuation.

"THE same is true of excise taxes levied upon capital stock or total assets by the state direct. Improper reports are constantly being filed whereby the corporation is paying in excess of the amount contemplated by law. State officials ordinarily extract the check from the return and if the payment is in excess of the requirements of law they reason that if the tax payer does not know enough to figure his tax correctly that that is his business and they accept the check.

"The same is true of all standardized equipment, real estate and improvements. As many values are returned as there are oil companies. Almost invariably the assessor and lords of revenue equalize all of the returns by increasing the lower to the highest. It often happens that the highest valuation is above actual present value and is always in excess of the prevailing ratio of assessment in that locality. By this process the property of the oil industry is being assessed higher and higher over an ever widening area. I have no doubt that the property of the industry generally is assessed higher than that of any other industry in the country. This deplorable situation can only be remedied by attention and co-operation.

All of which is true, I hear some critic say, but what are you going to do about it? First of all I would secure co-operation among the members of the industry—co-operation mind you, not conspiracy. Co-operation for mutual benefit as the various other groups of the modern business world co-operate for mutual benefit. I would create some means of distributing useful information among the members—a clearing house if you please where information could be exchanged.

"I would have the entire industry resist every proposed measure levying an unjust tax burden as I would have it resist every unjust assessment under existing law. Experience tells me it pays. It is my policy to file valuations at the prevailing ratio of assessed to actual value in that particular taxing district. If there is an increase of $300 or more in any schedule so filed, it must be reported by the field man to the general office and a protest made to the assessing official or board making the increase. Taxing officials in our territory have long since discovered that if they increase our schedules, they have a long, though it may be a good matured argument on their hands.

"I would adopt the same policy with legislatures and state officials generally. I would not protest every unfriendly measure from the time it was formulated until such time as the governor had made it a law by his signature.

"If it then appeared to be an illegal one, I would protest it in all the courts until its validity was determined. A fighter is usually respected and if contests are argued with good nature and diplomacy, there is little danger of alienating public sentiment. I have conducted a good many fights against undesirable legislation and have contested the resulting laws in the courts, without any loss of public favor.

"A fair and tactful handling of public officials will get results in 95 cases out of 100."

Greene Gives Up N. P. A. Work Temporarily

WASHINGTON, Dec. 10.—Active direction of the department of manufacture of the National Petroleum Association has been given up temporarily by Howard H. Greene, of the Kendall Refining Co., Bradford, Pa. owing to illness and P. S. Tarbox, of the Independent Refining Co., Oil City, has taken charge of the department, so E. M. Lyons, of the Tiona Refining Co., Warren, President of the association, announced in his recent bulletin to members.

T. J. Hilliard, Waverly Oil Works, Pittsburgh, has agreed to take charge of the department of economics accounting and statistics, during the temporary arrangement. Mr. Tarbox has been in charge of this work. Mr. Greene is recovering from his illness.

Natural Gasoline Industry Must Develop New Markets Independently

By E. R. Lederer*

Presented before American Petroleum Institute meeting, Chicago, Dec. 6-8

THE economic situation of the natural gasoline industry today is no longer a question of higher or lower profits; it has become a fight for existence. From a modest start about 10 years ago it has developed into an important factor and inherent part of the petroleum industry.

It has participated in the rapid growth of the latter, has adopted improved equipment and methods of its sister industry—refining—and has developed its own new apparatus and scientific ways to increase efficiency of operations and improve the quality of its products.

This industry has filled a serious gap in the producing end by eliminating the previously existing waste of casinghead gas and natural gas, thus conserving millions of cubic feet of rich gas and converting it into a useful and necessary product. It has earned a place in the economic structure not only of the petroleum industry, but of the country's entire industrial life.

It has 1148 plants, of which 1106 are in operation with a daily capacity of 6,680,417 gallons; partly completed or under construction—11 plants, with a capacity of 173,500 gallons. These plants represent an investment of many million dollars and employ a large staff of scientific men and several thousand other employees.

The opening of several large pools during the past few years has seriously influenced the price structure of the entire petroleum industry. This overproduction of crude and the increased efficiency of refineries has made a valuable and most essential product—gasoline, a cheap commodity.

Other factors tending to break down a fair and profitable income from this basic refinery product are politics and the easily influenced public opinion. We all feel and fear that cheap gasoline is here to stay, and low gasoline prices mean also low natural gasoline prices.

Since the beginning of the serious decline of gasoline prices in the summer of 1926, our prices have followed them very closely, and sales managers, I have asked, feel that the price of U. S. Motor gasoline will remain our top price or very close to it, either way.

DEVELOPMENT, through research, of wider markets for natural gasoline, not only as a motor and aviation fuel, but also in the field of chemistry, was advocated by Dr. Lederer, in his address before the American Petroleum Institute meeting at Chicago.

Dr. Lederer pointed out that the present trend in refining practice both here and abroad, is to make a motor fuel independent of blending with natural gasoline; and that redoubled efforts on the part of the natural gasoline industry are necessary to show the public the superior advantages of motor fuels containing natural gasoline.

Development of commercial aviation will provide the natural gasoline industry with a slowly expanding market, he said. Organized research work, through company laboratories, through university scholarships and combined association effort would result in opening entirely new markets, he said.

RIGHT now quite a number of refineries are shut down; a large percentage of the cracking capacity is idle. This means a smaller demand for casinghead gasoline. Our production of this commodity, however, goes on; we cannot shut down our plants or reduce our runs without losing or wasting our costly raw material. Our highly volatile finished product is much harder to store than the refined oils.

The modern cracking units and their highly developed fractionating equipment produce finished gasoline, which betters U. S. Motor specifications and needs no blending with natural gasoline. Mixed with straight run gasoline it improves it and reduces again the percentage of natural gasoline which otherwise would be required to bring it up to specifications.

The amount of natural gasoline required for blending a high-gravity export gasoline has also been greatly reduced. The foreign market is realizing more and more that U. S. Motor specification gasoline is good enough for their automobiles. The refining capacity in England is increasing continually; new refineries are going up in France, South America and in the Far East. Refineries, destroyed during the war or idle due to lack of crude, in Russia, Roumania, Austria, Hungary and Poland, have been rebuilt and refine crude from the restored and newly worked oil fields of these countries; Germany and France are constantly developing gasoline substitutes.

The price of our product is regulated by the demand for export and domestic business. When both fall off, it is obvious that there is always plenty of natural gasoline available for spot sales, except when several large buyers enter the market at the same time, and in spite of the fact that spot sales generally represent only one eighth to one tenth of all the natural gasoline sold, they regulate the official market-quotations and form the base for new contracts.

THERE seems to be no decline of surplus natural gasoline in sight. Statistics show that in 1926 refineries produced over 12 billion gallons of gasoline, an increase of 15 per cent over 1925. The natural gasoline industry produced 1.3 billion gallons, or 23 per cent, over 1925.

We estimate to see this year a gasoline supply of 14 to 15 billion gallons, and a natural gasoline production of 1.6 billion gallons; this means an increase over 1926 of about 15 to 16 per cent for both grades.

Production of natural gasoline compared with refinery gasoline has climbed from 5 per cent in 1916 to 12 per cent in 1927. We used to average 10 per cent natural gasoline for blending purposes, while today actually only 5 to 7 per cent are used. Besides the changes and improvements in cracking operations, the efficiency of vapor recovery sys-

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tems in refineries producing about 1 million gallons of good blending material daily, equal to 26 per cent of natural gasoline production, have caused this surplus of available natural gasoline.

This has to be disposed of and placed on other markets if we expect to receive a price for this product, which will permit the manufacturer a fair margin of profit for his investment.

ALL this shows that our industry is not standing on its own feet yet.

It is right that a comparatively small industry should lean against and depend on its larger and stronger relatives; but if their situation becomes critical, then it is high time to become more independent and develop means and ways to save ourselves.

I do not mean to say that we should separate ourselves from our relatives—this would be entirely wrong and faithless to the common cause. On the contrary, we must try and relieve our partners from a certain responsibility they should feel toward us, and work out our own salvation. The very important, almost vital question is now: How can this be done?

The association took the first step in the right direction when it solicited over a year ago from its members funds for natural gasoline research. This scientific work has not only convinced our own members, but refiners, jobbers and marketers, and to a certain extent the general public, of the real value of natural gasoline as a component for motor fuel. The refiner is still hesitant to use more of our product for blending than absolutely necessary to meet the present U. S. Motor specifications.

We are sure that the time is not so far off when gasoline will be sold on performance rather than on specifications, which alone cannot much longer be a criterion of good gasoline. Some departments of our government consider already very seriously buying lubricating oils this way and motor fuels will soon follow.

Right there is an opportunity to apply the results of the work Dr. Brown developed for us. Our industry should be represented on Committee D-2 of the American Society for Testing Material—independent from the refining industry. Dr. Brown has proven by actual tests and demonstrations that up to 40 or 50 per cent of natural gasoline can and should be blended with refinery gasoline—according to the character of the original crude—to produce a satisfactory motor fuel for the present-day motor.

We would not have enough natural gasoline if the refiners would have to furnish this ideal motor fuel right now, and instead of worrying what to do with the surplus we would have to find ways to produce more.

Vapor-phase cracking—the new menace for our industry—is far off yet, to become common refinery-practice and furnish a large quantity of perfect motor fuel.

Other industries are making continual surveys and studies how to reduce cost of production. Right now large refineries are replacing small or inefficient units—especially crackers and shell stills—with more efficient larger ones, in order to multiply the original thruput and produce much more gasoline at lower costs, which will net them a profit even at low tank-car prices.

No doubt our modern plants are quite efficient, but I know that production costs even in the best equipped plants are dangerously close to the market-price. I believe there is a possibility in most plants to reduce manufacturing costs by careful study of equipment, operation overhead, etc.

Of course, smaller manufacturers cannot afford to employ high priced trained and experienced engineers to make these studies and recommendations; here might be an opportunity for the association to step in and employ a good consulting engineer, for whose work the different manufacturers who use his services can prorata reimburse the association. Smaller refiners in Pennsylvania have a similar arrangement and I know it has worked out to their benefit.

Only a few of the largest manufacturers of natural gasoline employ a research staff of their own and have developed and placed on the market good aviation fuels.

The increasing number of flight hours should absorb gradually some of the surplus, although at present consumption of aviation gasoline represents only half of one per cent of all gasoline produced. If we survey other industries, like the gas, electric, cement, brick, steel, leather and many others, we will find that they maintain research laboratories of their own, financed by contributions from their members, and this research has proven a necessity and made millions of dollars for them in savings, development of new products and scientific marketing. The petroleum industry started such a research program some time ago. I do not think the natural gasoline manufacturers can or should wait, until their problems will be studied by this research committee.

But this industry can certainly do —though in a much smaller way— what the other industries did. As suggested in one of the directors' meetings of the association, fellowships can and should be established, at very nominal cost, at several recognized universities, to find other uses for natural gasoline, its constituents and residue-gas.

—There is a wide field open yet for *chemical* research, which might develop varied use of our commodity for solvents, chlorohydrocarbons, cyclic hydrocarbons, formic and acetic acids, alcohols and many other valuable products.

Such work should be directed, results assembled and digested by a proper committee of the association and either thru an association magazine or by the consulting engineer —I mentioned before—imparted to *all* the members.

The association would also assist thru this engineer to apply results of this research work to the individual member-plants, make estimates for necessary changes or new apparatus and assist in new operations.

It might also be worth our while to consider establishment of a central bureau for marketing natural gasoline or any chemical products derived therefrom for the benefit of such members who have no marketing facilities of their own; such an institution would certainly greatly contribute towards stabilization of the market.

I trust you will not consider these suggestions to relieve and improve the economic situation of the natural gasoline industry as utopian. I am sure many of you have more and probably better ideas and meetings like the present are the proper and most suitable opportunity to present them for the benefit and welfare of our industry.

Advantages of Standard Boilers Discussed

CHICAGO, Dec. 8.—Rex G. Hamaker, chief engineer of Humble Oil & Refining Co., in addressing the American Petroleum Institute standardization group on boiler standardization, stressed the advantages and economies definitely apparent for the boiler manufacturer and the production departments of producing companies.

He pointed out that the number of sizes of A. P. I. boilers has been reduced to four, thus eliminating excessive stocks of many sizes.

In discussing working pressures he identified them as follows for the four sizes:

H. P.	Pounds
30	150
50	150
65	175
85	175

These pressures he described as "pretty high for oil field type boilers and it must be remembered that a boiler of sufficient capacity with steam lines of ample capacity and protection provided are far more important to the delivery of horsepower than the pressure carried at the boiler. Good boiler installation and operation will bear out this statement."

By-Products Open Big Chemical Field For Natural Gasoline Makers

By Emby Kaye*

IN APPROACHING the problem of manufacturing by-products of natural gas (casinghead gas) and natural gasoline, the chemist will do well to concentrate development work on the utilization of those fractions that are ordinarily lost in the manufacture of natural gasoline (residue gas), and such fractions as should be removed from natural gasoline in order to make it more satisfactory as a motor fuel without blending with heavier naphthas.

With the gasoline extraction equipment working at top efficiency, some ethane, practically all of the propane, and heavier hydrocarbons are extracted, leaving a residue gas composed principally of methane and some ethane. At present, except in those cases where recovery plants lie close by commercial gas pipe lines, the residue gas is wasted entirely, or is burned under conditions of arrested combustion to form carbon black. Under this condition of the utilization of residue gas, the average sale value of the gas is 2 cents per thousand cubic feet, whereas the thermal value of this gas varies from 1000 to 1500 British thermal units per cubic foot and is worth infinitely more.

During recent years considerable experimental work has been done looking to the manufacture of by-products from natural gas by means of controlled chlorination. Several such processes have been evolved, each differing only in minor details of control or catalysis (1). The most illustrative method consists in the passing of a natural gas and chlorine mixture, preheated to between 200 and 400 degrees Centigrade, over coke or activated carbon that has been treated with a zinc chloride solution. The products thus recovered are nearly 100 per cent of the theoretically possible yield, and only a small amount of gas is passed out of the system. The products formed by the reaction of methane with chlorine are: methyl chloride, methylene chloride, carbon tetrachloride, and hydrochloric acid.

Since the reactions are exothermic, provision for regulating the extraction of heat from the reacting zone must be provided or the reaction chamber will reach such a high temperature that the reactions will take place with explosive violence with the formation of free carbon. When the reaction takes place with explosive violence, no substitution products of methane and chlorine are formed.

The reactions of chlorine with methane are as follows:

(1) For the formation of methyl chloride:
CH_4 plus CL_2 equals CH_3CL plus HCL

(2) For the formation of methylene chloride:
CH_4 plus 2 CL_2 equals CH_2CL_2 plus 2 HCL

(3) For the formation of chloroform:
CH_4 plus 3 CL_2 equals CH CL_3 plus 3 HCL

(4) For the formation of carbon tetrachloride:
CH_4 plus 4 CL_2 equals CCL_4 plus 4 HCL

(5) For the deposition of free carbon:
CH_4 plus 2 CL_2 equals C plus 4 HCL

I HOPE that, without presumption, I can say to those of you who are chemists, that the probable future of the chlorination of various natural gas constituents lies in controlling the conditions of chlorination so that a large percentage of methyl chloride be formed, and then effecting hydrolysis of the methyl chloride to form methyl alcohol. This process should provide an economical supply of the important industrial solvent, methyl alcohol. (See chart.) That this field is not saturated is attested by the many inquiries that come to us day by day.

A SECOND series of possible processes for the utilization of natural gas has been introduced in the past two years (2). These processes are the reverse of "cracking" (the term usually applied to the process of destructive distillation, by which heavy hydrocarbon molecules are broken up to form lighter hydrocarbon molecules in the manufacture of motor gasoline from heavier oils), as they have been developed for "constructive conversion" of hydrocarbon gases into liquid hydrocarbons. The procedure in these processes consists of preheating gases containing methane and other hydrocarbon gases to between 400 and 950 degrees Centigrade, then passing them, under pressure, over catalytic agents, such as zinc chloride, active carbon, elementary metals, or suitable mixtures of metal oxides.

The resultant products are cooled and the liquids condensed and separated from the gaseous constituents. The gaseous products from these processes contain ethylene, propylene, and butylene, which may be absorbed by scrubbing the gases with concentrated sulphuric acid (3). The alkyl acid esters thus formed may be hydrolized by dilution with water; and

A By-Product Industry Possible

MR. KAYE, in the accompanying paper, invited a glimpse into a field that has been comparatively little explored. He suggests that technologists, in building up a by-product industry based on natural gasoline, concentrate on the utilization of those fractions that are now eliminated from the gasoline in order to make a stable motor fuel.

The wild gases which are got rid of in process of manufacturing natural gasoline are mostly methane, with a little ethane, he says. These often are lost entirely or burned for carbon black at a return which nets about 2 cents per 1000 cubic feet, a fraction of their worth.

He states that two processes are available whereby methyl alcohol and other products can be manufactured from these wild gases.

*General Superintendent Gasoline Department Skelly Oil Co.

(1) Chlorination of Natural Gas, Technical Paper 225, Bureau of Mines.

(2) British patent 255,493 of July 18, 1925. Also British patent 255,829, and U. S. patent 1,571,994.

(3) Chemical and Metallurgical Engineering Volume 33, No. 7, of July, 1925. **Ethylene has been used with considerable success in ripening fruit. The advantages of shipping green fruit to market and artificially ripening it upon arrival, with the diminution of losses due to decay, are manifest.

the alcohols thus formed may be removed by distillation. The alcohols may be separated and further purified by subsequent distillations.

The alcohols thus formed are: ethyl alcohol, isopropyl alcohol, secondary butyl alcohol, and secondary amyl alcohol. The gases that are not absorbed in the sulphuric acid tower are transported to the burners of the preheater, where they are utilized as fuel to preheat the fresh hydrocarbon gases entering the system.

The liquid constituents obtained from the process are high in olefin content and several different organization units are investigating the possibilities of developing economic processes to convert them into alcohols, glycols, aldehydes, ketones, and acids. Olefin hydrocarbons of high molecular weight might be heated with air in the presence of mercuric oxide to form fatty acids of commercial importance (4). The economic aspect of the manufacture of any of the above possible series of compounds can only be determined by extensive experimentation. However, the liquid fractions could always be fractionated to form motor fuels. There is also a possibility of the recovery of benzol and toluol from the condensed liquids.

HAVING discussed some of the possibilities of utilizing the residue, it is well to consider what improvements and uses can be made of natural gasoline previously extracted from the natural gas. The "raw" natural gasoline as it comes directly from the distillation system "run-tank" contains propane, butanes, pentanes, hexanes, heptanes, and small percentages of higher hydrocarbons. The "raw" natural gasoline can be fractionated to remove a propane-butane mixture, which makes an excellent "stove gas." This fraction may be bottled under pressure and used as fuel in stoves located in isolated country homes, hunting lodges, camps, or in pleasure yachts. The liquid is vaporized immediately upon the release of pressure to form a gas high in thermal value, and which burns with a clean blue odorless hot flame.

This fuel has approximately 100,000 British thermal units per liquid gallon and is very economical for the indicated purposes. This gas has been successfully substituted for acetylene in cutting steel with the oxygen torch. Other wide uses now indicated as a result of satisfactory trial and experimentation are:

1. In firing ceramic furnaces for making pottery (also in the agateware industry), on account of the distinct advantage of this gas which is free from sulphur content and will thus not discolor the glazing of the pottery, which does occur with other known means of firing.
2. To use in place of blue-water gas for heating steel, such as forge welding, drop forging, etc. Here again, its advantage is the absolute absence of sulphur, and in the simpler equipment required by the users in making this gas ready for use, and greater uniformity.
3. Its use as a source of heat in the absorption type of portable refrigerator equipment. Experiments along this line are being conducted with refrigerator cars equipped with this type of equipment, containing a 1000 pound capacity hydrocarbon fuel tank charged with this gas, on account of the much lower weight of the fuel and its absolute reliability.
4. In fine metallurgy in reducing ores in electric furnaces.
5. Use as a base for cheaper synthetic plastics.

FOLLOWING the removal of the propane-butane fraction, a fraction of practically pure normal butane may be removed from the natural gasoline. This fraction may be shipped in tank cars constructed for 150 pounds per square inch working pressure. Butane is an excellent fuel containing 106,500 British thermal units per gallon. It vaporizes at 1 degree Cent. and forms 32.5 cubic feet of gas having a thermal value of 2,969 British thermal units per cubic foot.

In the manufacture of artificial gas, gas-oil is jetted into a firebrick lined chamber with transverse walls of checker brick maintained at an incandescent heat. The gas-oil undergoes destructive distillation, forming considerable tar, aromatics such as benzol and toluol, and the fixed incondensable gases which enrich the water gas. The cracking of gas-oil for gas enrichment results in the formation of tar mists of such fine subdivision that mechanical means of removal are unsuccessful. If the gas mains are to be protected from accumulative deposits of these tars, the use of electric precipitators must be resorted to. The recovery of the by-product tars, formed by gas-oil cracking, entails more expense than the value of the recovered products.

The substitution of butane should provide a superior product for this enrichment function, unattended by such difficulties. It is readily vaporized, requires no special equipment other than storage; and gives a clean enrichment free from any tarry or oily substances that tend to collect and restrict gas flow through the mains.

If butane were evaporated in a closed heat-exchange unit, heated by the gas which it is afterwards to enrich, the refrigerating effect of the amount necessary for enrichment will reduce the dew point on the total amount, both by reason of the cooling, and, to a less extent, by the increase in volume when vapor is added to the gas. (Condensate—chiefly water—after the cooling unit, can be removed in a drip before vapor is mixed in.)

BUTANE is so heavy that trouble might possibly arise from this source in using it for the enrichment of blue-gas. On the other hand, we are informed that the specific gravity can be raised 20 per cent or lowered 10 per cent with no trouble in the adjustment of orifices in burners.

The use of butane gives practically the same gas enrichment as the same volume of gas-oil. While gas-oil contains somewhat greater thermal value per gallon than butane, the gaseous constituents obtained from cracking a gallon of gas-oil have a practically identical value in British thermal units as a vaporized gallon of butane.

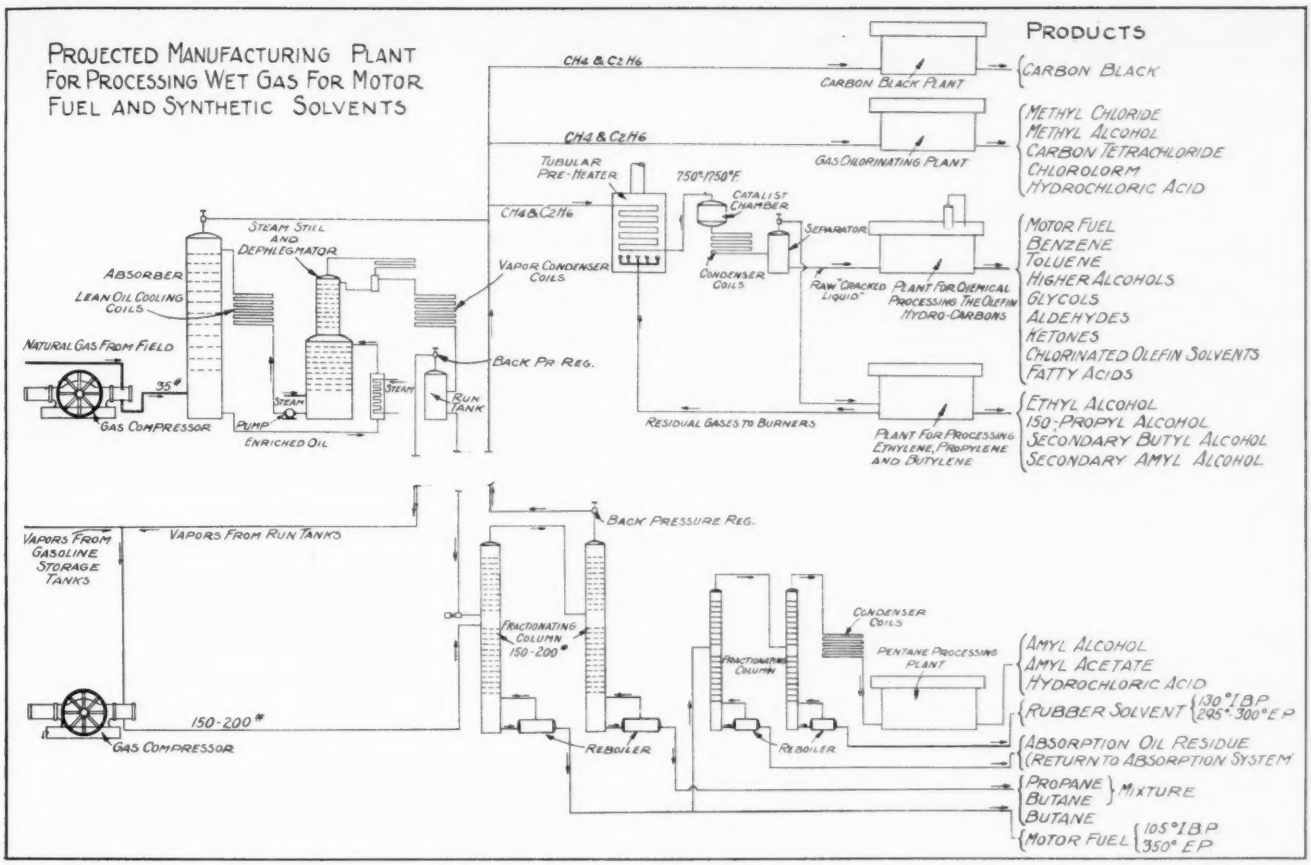
Butane is an excellent, efficient, and inexpensive refrigerant. Comparatively little energy is required to operate a butane system as compared with ammonia and for this reason it has found preference in home refrigerator systems. It presents a future possibility as a refrigerant upon a large scale in the manufacture of refrigerator cars for the shipment of meats and vegetables, to which reference has already been made.

The gasoline remaining after the removal of the butane, has an initial boiling point of approximately 105 degrees Fahr. and an end point of approximately 350 degrees Fahr. It makes an excellent motor fuel for aviation or car motors. However, a pentane cut may be fractionated from the motor fuel gasoline and chlorinated and then hydrolized to form amyl alcohol (5). The amyl alcohol may be sold as such, or may be acetylated to form amyl acetate, a valuable solvent in pyroxylin lacquers.

THE removal of the pentane cut leaves a residual gasoline of about 130 degrees Fahr. initial boiling point and 350 degrees Fahr. end point. This fraction may be distilled to remove the small percentages of heavier naphthas present, to produce a 295-300 degrees Fahr. end point fraction, which may be marketed as a rubber solvent for the manufacture

(4) Organic Chemistry. J. F. Norris—1922.

(5) Chemical and Metallurgical Engineering, Volume 34, No. 5, May, 1927.



of rubber cements. I say, "may be marketed," although I should say, "is being marketed and has been marketed for some time."

The preceding paragraphs list only a few of the possible product divisions obtainable from natural gasoline. Bearing in mind the cheapness of the raw material and fuel for the conversions, it is evident that a great many of them are practical today. The state of development work in some companies, and courtesies extended, do not permit discussion of more of the work which is now in progress.

AS WE become more involved in this subject, it has been our observation that the chemists have hardly realized the amount of intermediate hydrocarbons that are available, not to speak of some two hundred billion feet of methane and ethane that are going to waste as residue gas after gasoline extraction. Let me indicate the proportions of gases that are, or may be, obtained through natural gasoline plants.

There are being processed something like one thousand forty-two billion feet of natural or casinghead gas per annum from which one billion six hundred forty-two thousand gallons of gasoline are recovered. From this, an average of 10 per cent is now removed by weathering or stabilizing, the constituents removed being, chiefly, propane and butane. Further amounts could well be recovered if the fractions become valuable. The amount ultimately available is, roughly, 20 per cent of the total net gasoline production, or about 325,000,000 gallons annually.

CHEMICAL engineers, not familiar with the oil business, who read in the books on distillation that fractionation of pure paraffine hydrocarbons is extremely difficult and expensive, should consider that the difference in boiling points is very great on the light end of the series and that the number of isomers is smaller. Existing large-scale installations of several companies are now easily and continuously making butane and propane for their own purposes of vapor pressure control in motor fuels with a boiling range of 10 degrees Fahr. or less. While it is true that the highest degree of purity is difficult to obtain, commercial purity, of the order of that obtained with other liquids of commercial large-scale use, is now available in tank car lots. If any of you want to buy a few tank cars of propane or butane per day, you may be surprised to find how many manufacturers are prepared to sell them to you, and that Interstate Commerce Commission rules are already made and containers developed and in actual use.

The use of these hydrocarbons as a specialized fuel is a reality today. The gas is available because nature has prodigiously provided it. Everywhere, save in one place, gaseous British thermal unit is more expensive than liquid or solid British thermal unit. Only in the oil field is gaseous British thermal unit cheaper. It cannot always be stored, nor piped in large quantities from every field; it would be uneconomic. But it can be tanked and shipped to almost any point, and compete as a special fuel in special industries, and in many places instead of gas in its domestic application. The more ideal uses are in the hands of the chemists.

WHAT does not appear practical today will be made practical tomorrow by greater absorption of the teachings and the work of Blau, Garner, Burrell, Thompson, Campbell, and others, and perhaps by cooperative research and development. Instead of accomplishing what has been called "stabilization at a loss" by evaporating light fractions, it is written into the future that stabilization will become, rather, an "effect" instead of "cause"—that stabilized gasoline (finished motor fuel) will be the residue after the raw material has been broken down and looted for valuable constituents. Natural gasoline in the hands of the initiated will be a chemical material.

Obsolescence of Equipment Reduced by Standardization

CHICAGO, Dec. 12

PURCHASING departments of oil companies are enthusiastically in accord with the results of equipment standardization already obtained by the American Petroleum Institute, according to a paper presented at the Chicago institute meeting by R. M. Ketchum of the General Petroleum Corp., Los Angeles.

"We feel this way," he said, "because we see, from results already produced, that the institute fosters the twinship so vital to business success—economy through standardization."

Mr. Ketchum pointed out that, simmered down to essential facts, "you are attempting ultimately to reach two objectives through your standardization program: first, standardization in the manufacture of materials; and, secondly, economy of maintenance as a result of this standardization. In short, you are seeking to reduce a complex situation to a simple situation."

The oil buyers group of the National Association of Purchasing Agents at the Grand Rapids convention last June, prepared a resolution offering their services to the institute for whatever assignment or duties this institute might indicate, and further, outlined a possible plan whereby they might promote institute projects.

"There was a three-fold reason for the offer," according to Mr. Ketchum." "The first was entirely selfish; we desired to become a body actively identified with the institute to strengthen our effectiveness in the business world. The second reason was patriotic, primarily, because your aims are in harmony with the U. S. Department of Commerce in their efforts toward standardization. The third reason was because many purchasing agents are in charge of the salvage or reclamation department of their companies, and anything having to do with standardization of units of materials is of intriguing interest and of obvious importance to purchasing agents.

"ON THIS last mentioned subject, salvage, it is confidently predicted that, as institute standards become generally used, that bugbear of the oil business—obsolescence—will become incidental only and the welcome consequence will be that the line on the graphic chart showing materials reclaimed, repaired and returned to service for a second stint of duty will rise with pleasing speed."

A situation prevails to a certain extent at present in the oil industry, according to Mr. Ketchum, which is experienced by any industry when progressive forward movement is instituted. That situation has to do with the disposition of materials rendered semi-obsolete.

"This condition as I see it," says Mr. Ketchum, "is one of doubt. It is a mental situation in a way. While it is true that materials in large quantities as made according to pre-A.P.I. standard will be rendered obsolete, these same materials need not be discarded. They can be used and their full value realized. It will require the most careful and congenial cooperation between the purchasing and operating departments to accomplish this, but it can be done. It is being done every day, as a matter of fact.

"When the standardization plan of the A.P.I. was proposed, it was doubtless the opinion of many that the idea was preposterously impossible. It is still questioned, but with diminishing intensity of doubt. Mark this, the A.P.I. program of standardization is destined for success just as certainly as were the automobile, the automatic machine, the transcontinental railroad and the aeroplane, because this undertaking of the A.P.I. spells progress.

"THE major oil companies do not make a practice of making mistakes of judgment and as all of the major oil companies throughout the nation support this idea of A.P.I. standardization and support it in tangible manner, they evidently judge the A.P.I. idea to be sound. At any rate, they specify and purchase materials in accordance with A.P.I. specifications.

"As a representative purchasing agent in the oil industry, I will welcome most heartily that inevitable day when I can sign my name to orders specifying, without exception, the following. 'Materials described on this order to be furnished in strict accordance with A.P.I. specification.' Why will I be so glad to do this? Firstly, because one set of specifications will cover each commodity, instead of a different specification for the product of each manufacturer; secondly, because due to interchangeability, inventories in the Stores Department, for which I am held responsible, may be kept at the minimum of investment; thirdly, because materials and parts should at all times be readily available, due again to interchangeability; and finally, because I am definitely sold on the idea of progress."

It strikes Mr. Ketchum, he says, that "the Institute holds in the hollow of its palm the secret of absolute elimination of the trial and error method of proving the thousand and one specialties which appear each year on the market, created by ingenious minds to fill some particular niche in the oil world. . . . May it be suggested that retaining the identical division of the oil world which you have already established for standardization work—Eastern, Mid-Continent, Louisiana-Arkansas. Texas. Rocky Mountain and California districts—you select and appoint with careful thought technical men under whose supervision tests on these previously mentioned specialties will be made as they appear.

"The general plan to be followed might well be based, fundamentally at least, on the plan used since 1901 by the Underwriters' Laboratories. Outlining briefly, a manufacturer desiring a try out or service test would make application for test to the purchasing agent of any oil company or to any member of the regional test committee. The applicant would be supplied with the proper A.P.I. application blank provided by the A.P.I. This application would describe his product, its purpose, character, size, etc., and accompanied by drawings or illustrative cuts would be handed by the purchasing agent or committeeman to the regional test chairman. The committee would analyze the need of the industry for an article as described in the application for test.

"If no apparent need was manifest or if no greater efficiency could be gained or if no economy could be realized, then this application, so far as the A.P.I. is concerned, would be rejected, possibly with constructive suggestion to the manufacturer for a revision as regards design. Otherwise, the application would be accepted and test begun. The general result should show the saving of many dollars now utterly wasted through the indiscriminate and ill-advised conduct of so called 'try out', which mean nothing so far as profitable results are concerned to either the operator or the manufacturer himself.

"THE practical results of such a plan should be twofold. Firstly, new materials would be purchased for practical and scientific test, instead of as now for an indifferent, unscientific try out; and the results given by these materials would be, under this plan, alertly observed by these testing engineers. The reports would be based upon fact, under the eye of technical skill, and not upon the untrained observation of non-technical men. The reports would be given the industry at large and not confined to the concern making the observation. Secondly, such an arrangement would permit of the prompt, economical investigation of newly created specialties.

Practical Method Offered for Giving Data on Life of Wire Lines

By. H. H. Anderson*

Presented before American Petroleum Institute at Chicago, Dec. 5-8

THE mythical deed of Prometheus to bring light to the groping earth, and the task of Hercules to release him, both fade to insignificance before the task of the American Petroleum Institute's standardization committee to release wire rope specifications which will bring light to the groping wire rope users. These users cannot be satisfied with a light which will show them how to determine if a rope is good before it is run—they will need also another light which will show them how to determine if the rope was good after it is worn out.

The engineer asks, "How can we determine if this brand of wire rope will give good service?" The manager asks, "How much service did this brand of wire rope give per dollar invested?"

The purpose of this paper is to describe a method developed recently by a large California operating company to determine the relative costs and services rendered by their wire rope casing lines. In consideration of the great volume of exact test work performed by the committee, this method may have a paucity of scientific merit. Possibly its only claim is that it may serve as a practical basis to compare approximately in dollars and cents the service costs of the different wire rope casing lines, but, if this can be done to the satisfaction of the operator and with reasonable fairness to the several competitive brands of wire rope compared, the method represents a step forward.

For some time the drilling organizations have realized the need for better wire rope casing lines, and possibly too often their selection has been influenced by unproven claims of manufacturers that an improved article is available.

Manufacturers with several construction types to offer have been free to prescribe that one combination of circumstances demands one type of rope and another condition demands a different type. Yet often two types will be sent out on one delivery with no designation as to which rope is of which type. With a selection of trade names derived principally from the rainbow, the uninitiated user usually is ignorant of even the general distinguishing characteristics of the ropes received.

Evaluating Wire Lines

THIS practical method of determining the relative costs and services rendered by wire rope casing lines was developed by the Shell Co. of California and described at a Group Session of the American Petroleum Institute meeting at Chicago Dec. 8 by H. H. Anderson, chief engineer of the production department of the company.

It represents a step forward in oil company practice, in the opinion of Mr. Anderson, because it serves as a practical basis to compare approximately in dollars and cents the service cost of different wire rope casing lines.

A formula is given for calculating the amount of work done by wire lines in ton-miles and important tables, herewith reproduced, were a part of Mr. Anderson's paper, giving results of many tests made by the company following this method.

In the attempt to bring order out of an unsatisfactory condition, it was considered inadvisable to limit in any way the choice of lines by the ultimate users (the drilling department) until a fund of definite comparative identification, laboratory and service data could be obtained. Therefore, instead of specifying "A.P.I. Wire Rope", each wire rope purchase order contained the following clauses:

"This rope is to equal or exceed in quality the A.P.I. Specifications for Wire Rope (Standards 9A as amended by Circular S-56), for Grade.....

"The outer end of each line is to be double-served to allow us to cut off a 5-foot sample for test.

"Please furnish us with a copy of your own A.P.I. test on each line, identifying same by the line number as marked on the delivered reel, our order number as given hereon, and the district to which the lines are delivered."

This last paragraph afforded means to study the psychology and cooperation of the manufacturers. The majority of them complied fully and willingly, some not so willingly, and one explained that he did not sell his rope to meet A.P.I. specifications and he therefore refused to give out his own laboratory tests on it.

Upon receipt of the lines in the field storehouses, the 5-foot samples were cut off and forwarded to a central point. Here certain of them were selected and sent to a local commercial laboratory for A.P.I. test. All samples were sent of the lines of the unobliging manufacturer, and a sufficient number of other samples were sent to check the available factory test records.

WHAT a revelation these test records effected! Among the 150 "one-inch casing lines" purchased in ten months from eight manufacturers there were found to be seven types of strand construction, four types of core construction and several grades of material in 17 identifiable combinations. Certainly the need for a method to determine which of these ropes gave the cheapest service was imperative.

In Figures 1 and 2 are shown the several types of strand and core construction found in these ropes. Inasmuch as they were purchased only from eight manufacturers it is quite probable that several other ingenious combinations exist. Because of the confusing ambiguity of the general term "6/19", the various constructions in Figure 1 are designated by the actual numbers of wires in the strands, which range from 19 to 37.

It is too early to draw conclusions as to which types of strand construction give best service in heavy rotary drilling work, but there is evidence to support a tentative opinion that types 2, 3, and 4 are best adapted for these conditions. Most of the

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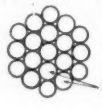
TYPICAL WIRE ROPE CASING LINE STRAND CONSTRUCTIONS

EACH ROPE COMPOSED OF 6 SIMILAR STRANDS OVER MANILA OR WIRE CORES.
(Usual Practice is to make whole rope Right Lay, and individual strands Left Lay.)

Wire	No.	Diam.
HW. -	1 @	.0710"
IW. -	6 @	.0700
OW. -	6 @	.0740
	- 6 @	.0560



1. 6/19 WARRINGTON 1-6-6/6
Usually Left Lay

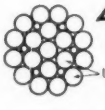
HW. -	1 @	.1020"
IW. -	9 @	.0430
OW. -	9 @	.0830

2. 6/19 SEALE, REGULAR 1-9-9
Usually Left Lay

HW. -	1 @	.0530"
IW. -	5 @	.0710
FILLERS	5 @	.0310
OW -	10 @	.0740

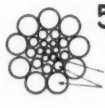
3. 6/21 SEALE, MODIFIED WITH FILLER 1-5-5-10
Usually Left Lay

HW. -	1 @	.0710"
IW. -	6 @	.0650
FILLERS	6 @	.0280
OW.	12 @	.0650



4. 6/25 SEALE, MODIFIED WITH FILLER 1-6-6-12
Usually Left Lay

HW -	7 @	.0320"
IW. -	9 @	.0430
OW.	9 @	.0830



5. 6/27 SEALE, MODIFIED WITH STRANDED HEART WIRE 1-6-9-9
H.W. Right Lay
I.W. and O.W. Left Lay

HW. -	1 @	.0475"
	- 6 @	.0430
FILLERS	6 @	.0230
IW.	12 @	.0430
OW.	12 @	.0680

6. 6/37 SEALE, MODIFIED WITH STRANDED HEART WIRE AND FILLER 1-6-6-12-12
Usually Left Lay

HW. -	1 @	▽
IW. -	12 @	.0430"
OW. -	12 @	.0725

7. 6/25 FLATTENED STRAND
Usually Right or Lang Lay

FIGURE 1. H.H. ANDERSON

TYPICAL WIRE ROPE CASING LINE CORE CONSTRUCTIONS

EACH ROPE COMPOSED OF 6 STRANDS (See Figure 1) OVER ONE CORE AS BELOW
Cores are layed either Right or Left with Right Lay Rope.
All manila cores and hearts are impregnated with lubricant.

THREE MANILA STRANDS
(Appearance before compression)

FOUR MANILA STRANDS, HEART THREAD
(Appearance before compression)

ALL MANILA CORES
(Appearance after compression)

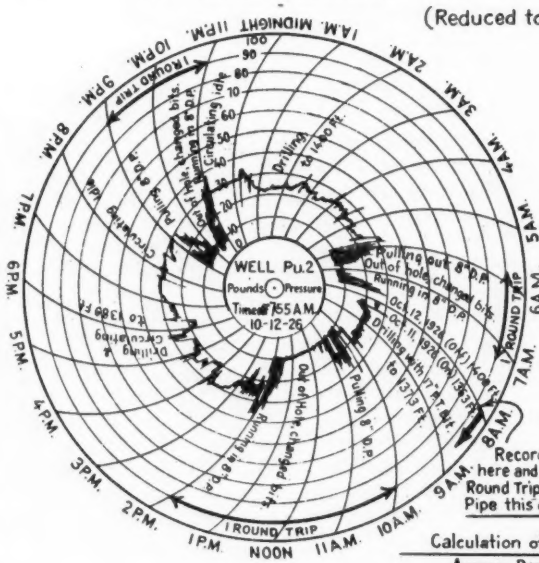
6/7 WIRE CORE, MANILA HEART

1/12 WIRE CORE, MANILA HEART

FIGURE 2. H.H. ANDERSON

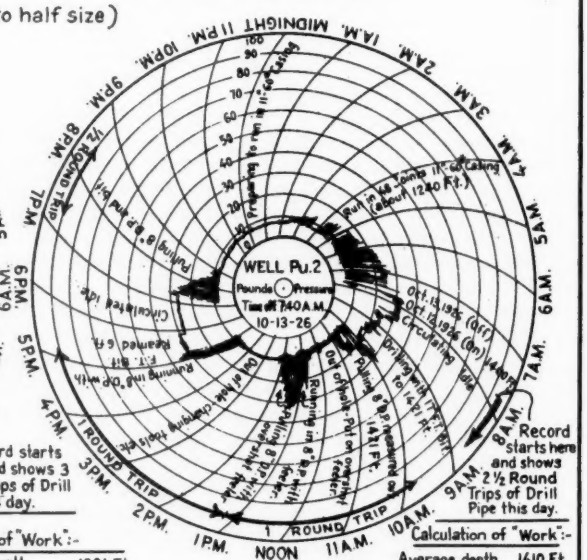
TYPICAL "RECORDING WEIGHT–INDICATOR" DAILY CHARTS

(Reduced to half size)



Calculation of "Work":-

Average Depth	1381 Ft.
8 5/8" 46.5 lb D.P.-Ton Miles per R.T.	12.1
x 3 Round Trips = Ton Miles	36.3
Total Ton Miles	36.3


WELL Pu.2
Pounds Pressure
Time 7:40 A.M.
10-13-26
1 ROUND TRIP
Record starts here and shows 2½ Round Trips of Drill Pipe this day.

Calculation of "Work":-

Average depth	1410 Ft.
8 5/8" 46.5 lb D.P. Ton Miles per R.T.	12.2
x 3 Round Trips = Ton Miles	30.5
Setting 1240'-11 3/4" 60 lb Casing-Ton Miles	5.2
Total Ton Miles	35.7

These charts record arbitrary gauge pressures which can be converted to wire-line tensions by means of a calibration curve. The interpretation of drilling operations can be made with a little study, and may be written on the charts before they are filed at the option of the operator.

FIGURE 3. H.H. ANDERSON

ropes are made with "all-manila" cores, but some of the standard brands have been furnished specially with combination "wire-and-manila" cores to prevent a tendency shown by certain of the "all-manila" cores to stretch or break and allow the rope to attenuate.

The A.P.I. tests for tensile strengths, torsions, and bends were received from the manufacturers and the local laboratory. Considerable variations in physical properties of different reels of the same brand of rope were found, such as shown in accompanying table below.

It is as yet too early to draw definite conclusions as to the practicability of the A.P.I. tests to establish the relative value of a line prior to its use, though the comparatively meager fund of available field service data does indicate several outstanding parallels of cause and effect which involve largely the factors of physical properties of the materials.

No matter how careful the efforts or how exacting the procedure developed to estimate the merit of a wire rope before it is run, it is necessary to develop some method to evaluate the service of the rope after it is worn out. The evaluation of labor service or of machine operation service usually is based upon the cost of work performed, and it is quite natural that "work"—the product of force or weight times distance (the true physical meaning)—should present itself as a unit capable of being priced. The most logical basis for comparison should be "the cost per unit of work performed."

Variations in Physical Properties of Different Reels of the Same Brand of Wire Rope

No.	Casing Line Identity		Average Tensiles Inside	Average Tensiles Outside	Average Torsions Inside	Average Torsions Outside	Average Bends Inside	Average Bends Outside
11	C-2-Plow	.....	221,900	217,200	33	30	55	9
6	C-2-Plow	.....	264,500	243,500	31	31	54	9
26	F-3-Imp.	Plow..	241,300	242,600	36	36	14	13
20	F-3-Imp.	Plow..	269,400	266,600	31	35	11	11

CALCULATION OF WORK IN TON-MILES (TON-MILES PER ROUND TRIP TAKEN FROM CHART IN FIGURE 4)

Date 1927	Number of Round Trips	Average Depth-Ft.	Ton-miles per Round Trip	Ton-miles for Day
Feb. 8th	4½	875	3.7	16.6
Feb. 9th	2½	895	3.8	9.5
Feb. 10th	3½	975	4.3	15.0
Feb. 11th	3	1065	5.0	15.0
Feb. 12th	5½	1160	5.7	31.3
Feb. 13th	2½	1280	6.6	16.5
Feb. 14th	1	1430	8.0	8.0
Feb. 15th	3	1490	8.4	25.2
Feb. 16th	0	1500	8.5	0.0
Feb. 17th	2	1525	8.8	17.6
Total Ton-miles of Service for Ten-day period—				154.7

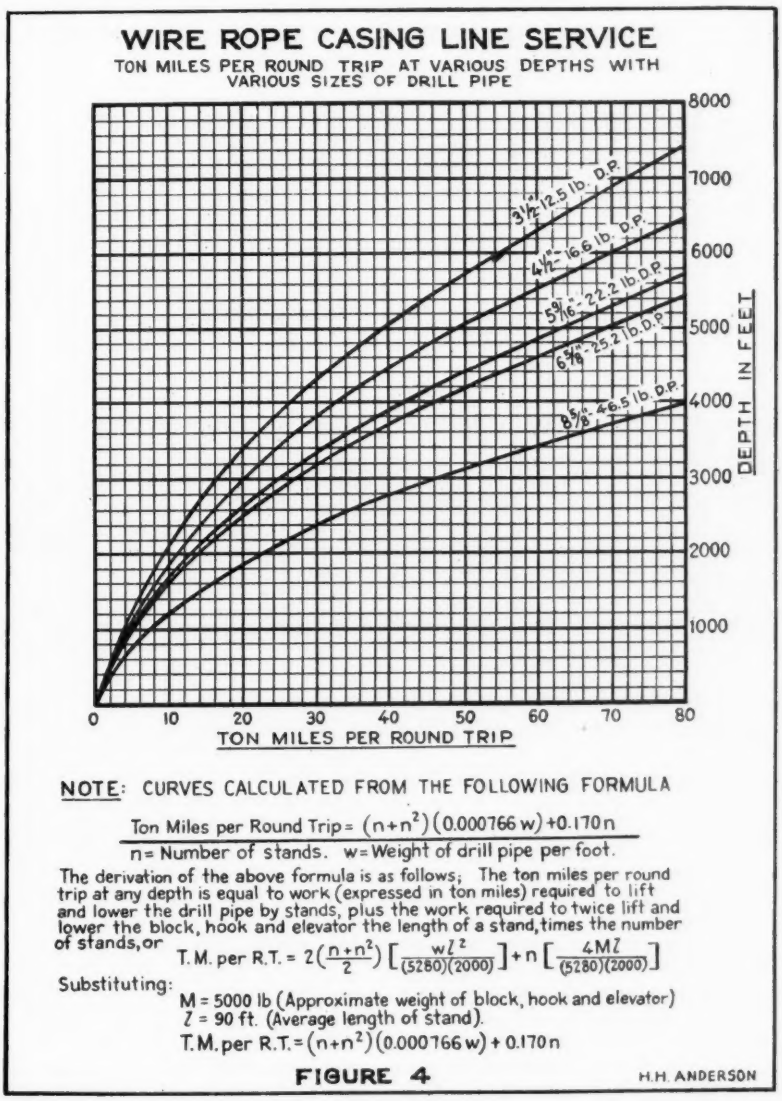

WIRE ROPE CASING LINE SERVICE
TON MILES PER ROUND TRIP AT VARIOUS DEPTHS WITH VARIOUS SIZES OF DRILL PIPE
3½"-12.5 lb. D.P.
4½"-16.6 lb. D.P.
5⅝"-22.2 lb.D.P.
6⅝"-25.2 lb.D.P.
8⅝"-46.5 lb. D.P.
DEPTH IN FEET
8000
7000
6000
5000
4000
3000
2000
1000
0
10
20
30
40
50
60
70
80
TON MILES PER ROUND TRIP
NOTE: CURVES CALCULATED FROM THE FOLLOWING FORMULA
Ton Miles per Round Trip = $(n+n^2)(0.000766\,w)+0.170\,n$
n = Number of stands. w = Weight of drill pipe per foot.
The derivation of the above formula is as follows; The ton miles per round trip at any depth is equal to work (expressed in ton miles) required to lift and lower the drill pipe by stands, plus the work required to twice lift and lower the block, hook and elevator the length of a stand, times the number of stands, or
T.M. per R.T. = $2\left(\frac{n+n^2}{2}\right)\left[\frac{w l^2}{(5280)(2000)}\right]+n\left[\frac{4Ml}{(5280)(2000)}\right]$
Substituting:
M = 5000 lb (Approximate weight of block, hook and elevator)
l = 90 ft. (Average length of stand).
T.M. per R.T. = $(n+n^2)(0.000766\,w)+0.170\,n$

FIGURE 4 H.H. ANDERSON

The function of a casing line is to transmit "work" to hoist and lower trips made and the depth at which each was made is a satisfactory plan to secure the simple fundamental data necessary for the calculation of work in ton-miles transmitted by the casing lines.

A large chart, similar to Figure 4, was prepared to simplify the calculation of the amount of work in "ton-miles" transmitted by the casing line during each round trip to "pull out" and "run in" the string of drill pipe, which is assumed to be suspended free in the hole. The curves on this chart can be calculated by means of either one of the following working formulae.

"Ton Miles per Round Trip" = $(n+n^2)(0.000766w) + 0.170n$ or = $L(20{,}000+wL) \div 10{,}560{,}000$ where

n = number of 90-foot stands of drill pipe in string, or

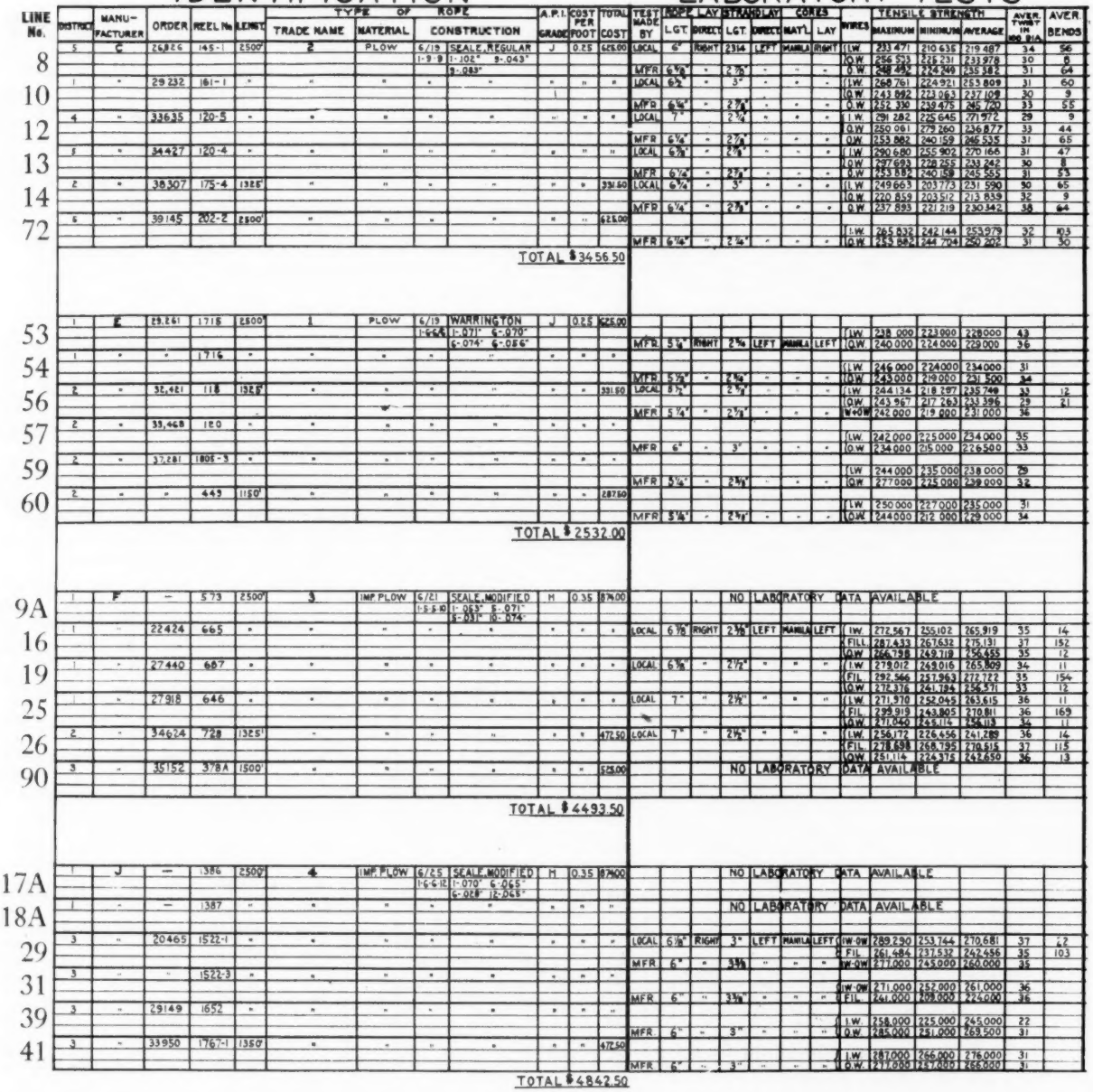
L = length of string of drill pipe in feet, and

w = weight per foot of drill pipe.

THIS particular working chart is developed for operations in 115 and 122-foot derricks where stands of drill pipe 87 to 93 feet in length are used. It allows also for the work transmitted to raise and lower elevators, hook and blocks (weight approximately 5,000 pounds) once for each stand of pipe "pulled out" or "run in". The fundamental formula is derived as shown also in Figure 4, and curves can be weights. In both operations a certain amount of work is transmitted. Though the work done on the pipe, elevators, hook and block during the lowering operation is algebraically negative, the work transmitted by the wire line to resist their free-fall is approximately the same as that transmitted

Figure 5. Typical Records of One Inch Four Types

(Note: Identification, Laboratory, and Field Service Tests Are On



IDENTIFICATION — LABORATORY TESTS

LINE No.	DISTRICT	MANUFACTURER	ORDER	REEL No.	LENGTH	TYPE OF ROPE: TRADE NAME	MATERIAL	CONSTRUCTION	A.P.I. GRADE	COST PER FOOT	TOTAL COST	TEST MADE BY	ROPE LAY: LGT.	DIRECT.	STRAND LAY: LGT.	DIRECT.	CORES: MATL.	LAY	WIRES	TENSILE STRENGTH: MAXIMUM	MINIMUM	AVERAGE	AVER. TWIST IN 100 DIA.	AVER. BENDS
8	5	C	26826	145-1	2500'	2	PLOW	6/19 1-9-9 SEALE, REGULAR 1-.102" 9-.043" 9-.083"	J	0.25	625.00	LOCAL	6"	RIGHT	2 3/4	LEFT	MANILA	RIGHT	LW	233 471	210 636	219 487	34	56
																			QW	256 533	226 231	233 978	30	8
												MFR	6 5/8"	"	2 3/8"	"	"	"	O W	248 492	224 249	235 582	31	64
10	1	"	29 232	161-1	"	"	"	"	"	"	"	LOCAL	6 1/2	"	3"	"	"	"	LW	260 761	224 921	253 809	31	60
																			QW	243 892	223 063	237 109	30	9
												MFR	6 3/4"	"	2 3/4"	"	"	"	O W	252 330	239 475	245 720	33	55
12	4	"	33635	120-5	"	"	"	"	"	"	"	LOCAL	7"	"	2 1/4	"	"	"	LW	291 282	225 645	271 972	29	9
																			QW	250 061	279 260	236 877	33	44
												MFR	6 1/4"	"	2 3/4"	"	"	"	QW	253 882	240 159	245 535	31	65
13	5	"	34427	120-4	"	"	"	"	"	"	"	LOCAL	6 7/8	"	2 5/8	"	"	"	LW	296 680	255 902	270 165	31	47
																			QW	297 693	228 255	233 242	30	8
												MFR	6 1/4	"	2 3/8	"	"	"	O W	253 882	240 159	245 535	31	53
14	2	"	38307	175-4	1325'	"	"	"	"	"	331.50	LOCAL	6 1/4"	"	3"	"	"	"	LW	249 663	203 773	231 590	30	65
																			QW	220 859	203 512	213 839	32	9
												MFR	6 1/4	"	2 3/8	"	"	"	O W	237 893	221 219	230 342	38	64
72	6	"	39145	202-2	2500'	"	"	"	"	"	625.00													
																			LW	265 832	242 144	253 979	32	103
												MFR	6 1/4"	"	2 3/4"	"	"	"	QW	253 882	244 704	250 202	31	30
								TOTAL $3456.50																	
53	1	E	29.261	1716	2500'	1	PLOW	6/19 1-6-6 WARRINGTON 1-.071" 6-.070" 6-.074" 6-.086"	J	0.25	625.00													
												MFR	5 1/4"	RIGHT	2 5/8	LEFT	MANILA	LEFT	LW	238 000	223 000	228 000	43	
																			QW	240 000	224 000	229 000	36	
54	1	"	"	1716	"	"	"	"	"	"	"													
																			LW	246 000	224 000	234 000	31	
												MFR	5 1/2"	"	2 5/8"	"	"	"	QW	243 000	219 000	231 500	34	
56	2	"	32,421	118	1325'	"	"	"	"	"	331.50	LOCAL	8 1/2	"	2 5/8	"	"	"	LW	244 134	218 297	235 749	33	12
																			QW	243 967	217 263	233 396	29	21
												MFR	5 1/4"	"	2 5/8	"	"	"	W+QW	242 000	219 000	231 000	36	
57	2	"	33,468	120	"	"	"	"	"	"	"													
																			LW	242 000	225 000	234 000	35	
												MFR	6"	"	3"	"	"	"	QW	234 000	215 000	226 500	33	
59	2	"	37,281	1805-3	"	"	"	"	"	"	"													
																			LW	244 000	235 000	238 000	29	
												MFR	5 1/4"	"	2 5/8	"	"	"	QW	277 000	225 000	239 000	32	
60	2	"	"	449	1150'	"	"	"	"	"	287.50													
																			LW	250 000	227 000	235 000	31	
												MFR	5 1/4"	"	2 5/8	"	"	"	LQW	244 000	212 000	229 000	34	
								TOTAL $2532.00																	
9A	1	F	—	573	2500'	3	IMP. PLOW	6/21 1-5-5-10 SEALE, MODIFIED 1-.063" 5-.071" 5-.031" 10-.074"	H	0.35	874.00				NO LABORATORY DATA AVAILABLE									
16	1	"	22424	665	"	"	"	"	"	"	"	LOCAL	6 7/8	RIGHT	2 3/8	LEFT	MANILA	LEFT	LW	272.567	255102	265.919	35	14
																			X FILL	287.433	267.632	275.131	37	152
																			QW	266.798	249.119	256.455	35	12
19	1	"	27440	607	"	"	"	"	"	"	"	LOCAL	6 1/2	"	2 1/2	"	"	"	LW	279.012	249.016	265.809	34	11
																			X FIL	292.566	257.963	272.722	35	154
																			QW	278.376	241.784	256.571	33	12
25	1	"	27918	646	"	"	"	"	"	"	"	LOCAL	7"	"	2 1/2"	"	"	"	LW	271,970	252.045	263.615	36	11
																			X FIL	299.919	243.805	270.811	36	169
																			QW	271.040	245.114	256.113	34	11
26	2	"	34624	728	1325'	"	"	"	"	"	437.50	LOCAL	7"	"	2 1/2"	"	"	"	LW	256.172	226.456	241.289	36	14
																			X FIL	278.698	268.795	270.815	37	115
																			QW	251.114	224.375	242.650	36	13
90	3	"	35152	378A	1500'	"	"	"	"	"	525.00				NO LABORATORY DATA AVAILABLE									
								TOTAL $4493.50																	
17A	1	J	—	1386	2500'	4	IMP. PLOW	6/25 1-6-6-12 SEALE MODIFIED 1-.070" 6-.065" 6-.089" 12-.065"	H	0.35	874.00				NO LABORATORY DATA AVAILABLE									
18A	1	"	—	1387	"	"	"	"	"	"	"				NO LABORATORY DATA AVAILABLE									
29	3	"	20465	1522-1	"	"	"	"	"	"	"	LOCAL	6 7/8"	RIGHT	3"	LEFT	MANILA	LEFT	LW-QW	289.290	253.744	270.681	37	42
																			X FIL	261.484	237.532	242.456	35	103
												MFR	6"	"	3 3/8	"	"	"	W-QW	277.000	245.000	260.000	35	
31	3	"	"	1522-3	"	"	"	"	"	"	"													
																			LW-QW	271.000	252.000	261.000	36	
												MFR	6"	"	3 3/8"	"	"	"	FIL	261.000	209.000	225.000	36	
39	3	"	29149	1652	"	"	"	"	"	"	"													
																			LW	258.000	225.000	245.000	22	
												MFR	6"	"	3"	"	"	"	QW	285.000	251.000	269.500	31	
41	3	"	33950	1767-1	1350'	"	"	"	"	"	472.50													
																			LW	287.000	266.000	276.000	31	
												MFR	6"	"	3"	"	"	"	QW	277.000	257.000	266.000	31	
								TOTAL $4842.50																	

to raise them an equal distance. The foregoing reasoning suggested the practical plan to measure and sum up in simple units all of the work transmitted to raise and lower the pipe, elevators, hook and block, etc., by each line during its entire period of service, and to express this work in "ton-miles" as a unit of convenient size.

To calculate with scientific accuracy the exact amount of work performed by a casing line is an almost impossible task. There are so many factors which may influence the result that one is lost in a bewildering maze of variables. Some of these latter which have been suggested by critics of the present-described method are:

1. Flotation of drill-pipe by mud-laden fluid.
2. Frictional drag of pipe on walls of hole.
3. Weight of pipe lifted.
4. Depth from which pipe is lifted.
5. Length of line purchased.
6. Number of lines strung in blocks.
7. Line-speed on fast sheave.
8. Diameter and length of drum.
9. Diameter and arrangement of block sheaves and material of same.
10. Temperature and humidity.
11. Type of prime mover, and horsepower of same.
12. District in which well is drilled.
13. Drillers' eccentricities.
14. Three-o'clock fag, etc., etc.

It is conceded that at least two of the foregoing factors may influence the results materially, but it appears useless to attempt to study their various effects without the selection of some fundamental unit as a basis for comparison.

Irrespective of other considerations, the lines will be discarded by the drillers when in their opinion they become dangerously worn, and there is little use to split hairs on methods of measurement when the largest fac-

Wire Rope Casing Lines. Six Each of Compared

the Same Lines, Line Numbers Being Given in Left Hand Column)

FIELD SERVICE

LINE No.	WELL NAME	DATE INSTALD	INDIVIDUAL SECTION DEPTH DRILLED FROM	TO	LENGTH CUT	ROUND TRIPS	SIZE OF PIPE	NO. OF LINES	DIAM DRUM	SERVICE DATA CROWN BLOCK TYPE	DIA SHEAV.	TRAVEL BLOCK TYPE	DIA. SHEAV.	TON MILES	COST PER TON MILE	TOTAL TON MILES	SERVICE COST PER TON MILE	REMARKS
8	Co. 1	4-14-27	2685'	3514'		149	6"		16"	F(RB)	30"	J(RB)	32"			4256	0.1467	ON HILD DRIVE
10	E.14	5-7-27	4159'	5487'	1000'	74	5¾4"		14"	A	24"	H(RB)	36"			3877	0.1615	
12	M.1	5-28-27	5485'	6220'		59	4"		16"	A	24"	H(RB)	36"			3776	0.1657	
13	Co. 1	5-29-27	3514'	4050'		94	5"		16"	F(RB)	30"	J(RB)	32"			3502	0.1784	ON HILD DRIVE
14	Cr. 8	11-18-27	4811'	5084'		23 7	5" 4"		18"	A	24"	H(RB)	36"			1669	0.1980	
72	Co. 1	7-25-27	4050'	4285'		106	5"		16"	F(RB)	30"	J(RB)	32"			3180	0.1965	ON HILD DRIVE
																TOTAL - 20,260	$ 0.1710 - AVERAGE FOR TYPE	
53	G. 25	6-13-27	5073'	5728'	900'	81	4"		14"	F(RB)	26"	H(RB)	36"			1723	0.3630	
54	E. 11	6-8-27	4631'	5343'	1000'	63	4"		14"	A	24"	J(RB)	32"	2140				
	E. 12	8-6-27	6215'							A	24"	J(RB)	32"	57		2197	0.2850	
56	Cr. 7	6-30-27	6287'	5319'		21	4"		16"	B	30"	H(RB)	36"			1167	0.2840	
57	Cr. 10	6-15-27	4173'	4889'		24	5"		20"	A	24"	H(RB)	36"			1243	0.2660	
59	Cr. 10	7-6-27	4889'	5333'		6	5"		20"	A	24"	H(RB)	36"			1807	0.1770	
60	A. 13	8-23-27	5190'	5590'		31	5"		18"	A	24"	H(RB)	36"			1384	0.2075	
																TOTAL - 9,521	$ 0.2795 - AVERAGE FOR TYPE	
9A	G. 23	1-17-27	3642'	4105'		110	5¾4"		14"	F(RB)	26"	H(RB)	36"			3623	0.2420	FISHING 82 TRIPS
16	E. 12	3-30-27	5735'	6215'	120'	25	4"		14"	A	24"	J(RB)	32"	1668				
	E. 10	6-26-27	4485'	4620'	300'	54	4"		14"	A	24"	H(RB)	36"	2286		3954	0.2215	
19	E. 15	6-18-27	4416'	5357'	900'	67	4"		16"	A	24"	H(RB)	36"	3361				
	T. 22	8-21-27	73'	2615'		75	8"6"		20"	A	24"	H(RB)	36"	590		3951	0.2216	
25	T. 16	4-4-27	6335'	6335'		1	4"	8	14"	A	24"	H(RB)	36"	77				
	G. 23	4-23-27	3991'	5065'	600'	92	4"		14"	F(RB)	26"	H(RB)	36"	3577		3654	0.2395	
26	Cr. 8	6-16-27	4144'	4811'		36	5"		18"	A	24"	H(RB)	36"			1837	0.2495	
90	Col. 40	7-31-27	6491'	6805'		35	5"	8	18"	A	24"	H(RB)	36"	2408				
	O. 14	9-30-27	0'	380'		3	8"	6	18"	A	24"	H(RB)	36"	5		2413	0.2175	
																TOTAL - 19,492	$ 0.2300 - AVERAGE FOR TYPE	
17A	T. 18	1-8-27	3732'	5775'	600'	8	5¾4"		18"	F(RB)	30"	H(RB)	36"			4094	0.2140	
18A	G. 23	3-11-27	3880'	3880'	1350'	114	5¾4"		14"	F(RB)	26"	H(RB)	36"			3749	0.2335	
29	Pu. 2	3-12-27	4632'	4928'		80	4"	8	18"	A	24"	H(RB)	30"			3741	0.2338	DIESEL ENGINE DRIVE
31	P. 5	3-20-27	4423'	5210'		54	4"	8	18"	A	24"	H(RB)	36"	2338				
	O. 10	6-10-27	3580'	4720'		28	3"	6	18"	A		H(RB)		845		3281	0.2675	
39	Col. 40	6-5-27	6042'	6491'		66	3"	8	18"	A	24"	H(RB)	30"			3961	0.2205	
41	O. 10	1-8-27	4720'	4978'		53	3"	6	18"	A	24"	H(RB)	36"			1890	0.2500	
																TOTAL - 20,716	$ 0.2390 - AVERAGE FOR TYPE	

tor involved is human judgment. However, it is comparatively simple to determine approximately the work in "ton-miles" transmitted by the line to raise and lower the pipe, elevators, blocks and hook if the pipe is assumed to hang free in the hole. This determination effects the exclusion of the many confusing variables which cannot all at one time be allowed for.

Simultaneously, other pertinent data can be obtained concerning the other influencing factors, and an attempt may be made later to determine how they cause the total work transmitted by individual lines to vary from the average total service rendered by other lines of the same brand.

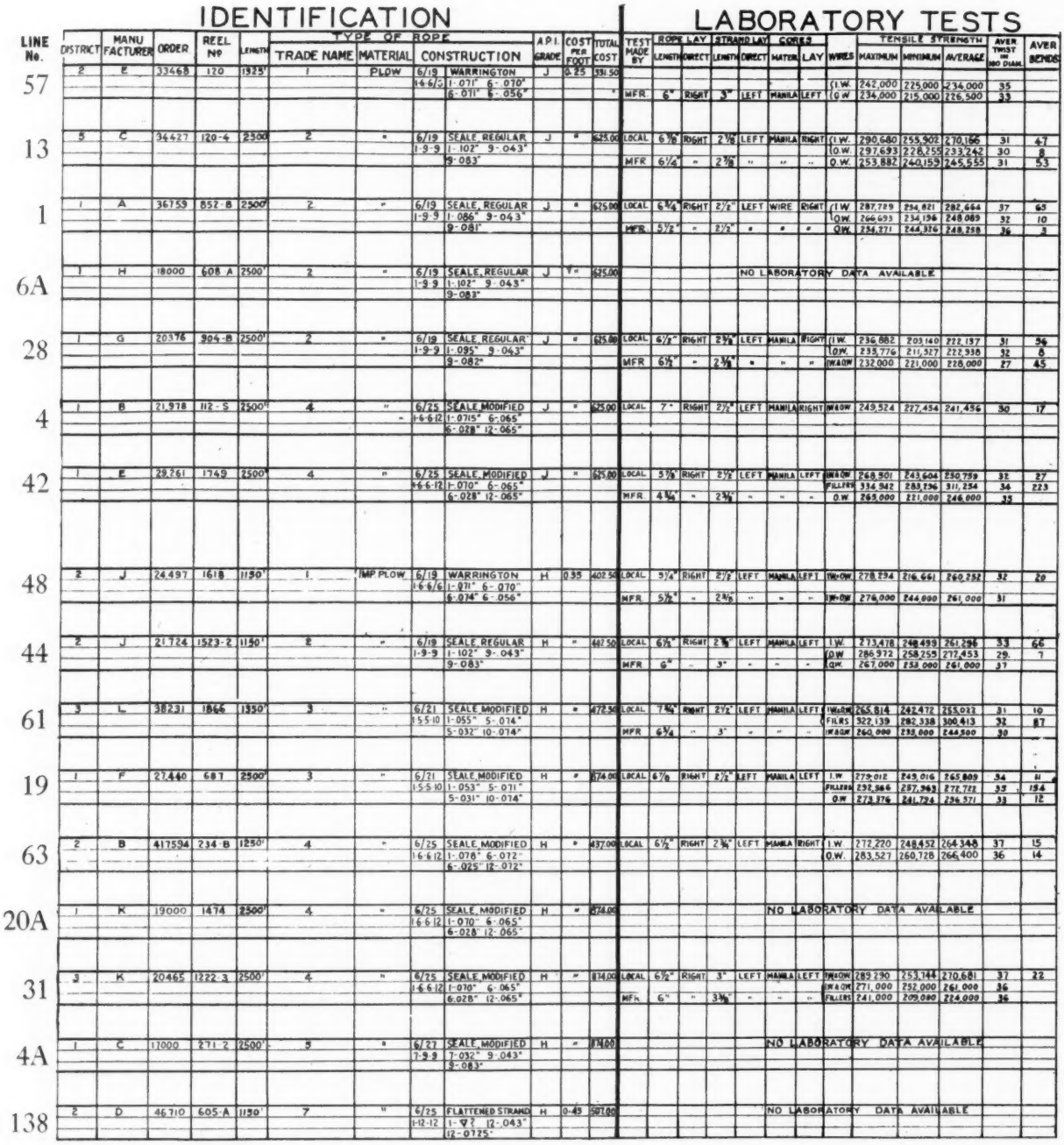
SERVICE COMPARISON

Instruments which will sum up the total ton-miles of work transmitted by a line are not readily available. However, recording weight indicators can be used to record how often the drill strings, etc., are pulled and lowered. They usually are attached to the dead ends of the casing lines to indicate the tensions in the lines at all times. These tensions can be reported to the driller by means of indicating pressure gauges placed conveniently, and they can be recorded for later consideration by recording pressure gauges placed where they will be free from vibration. The use of 24-hour charts are most convenient, and they assure the daily inspection of the gauges.

Two typical and consecutive daily records from a recording weight indi-

Figure 6. Typical Records of One Inch Wire Improved Plow

(Note: Identification, Laboratory and Field Service Tests Are On



LINE No.	DISTRICT	MANUFACTURER	ORDER	REEL No	LENGTH	IDENTIFICATION: TYPE OF ROPE TRADE NAME	MATERIAL	CONSTRUCTION	API GRADE	COST PER FOOT	TOTAL COST	LABORATORY TESTS: TEST MADE BY	ROPE LAY LENGTH	ROPE LAY DIRECT	STRAND LAY LENGTH	STRAND LAY DIRECT	CORES MATERIAL	CORES LAY	WIRES	TENSILE STRENGTH MAXIMUM	TENSILE STRENGTH MINIMUM	TENSILE STRENGTH AVERAGE	AVER TWIST IN 100 DIAM.	AVER BENDS
57	2	E	33468	120	1925'	1	PLOW	6/19 Lang WARRINGTON 1-6-6/6 1-.071" 6-.070" 6-.071" 6-.056"	J	0.25	331.50														
												MFR.	6"	RIGHT	3"	LEFT	MANILA	LEFT	(1 W.	242,000	225,000	236,000	35	
																			(0 W.	234,000	215,000	226,500	33	
13	5	C	34427	120-4	2500	2	"	6/19 SEALE REGULAR 1-9-9 1-.102" 9-.043" 9-.083"	J	"	625.00	LOCAL	6 7/8	RIGHT	2 1/8	LEFT	MANILA	RIGHT	(1 W.	290,680	255,902	270,166	31	47
																			10 W.	297,693	228,255	233,242	30	8
												MFR	6 1/4"	"	2 7/8	"	"	"	0 W.	253,882	240,159	245,555	31	53
1	1	A	36759	852-B	2500'	2	"	6/19 SEALE REGULAR 1-9-9 1-.086" 9-.043" 9-.081"	J	"	625.00	LOCAL	6 1/4"	RIGHT	2 1/2"	LEFT	WIRE	RIGHT	(1 W.	287,789	254,821	282,664	37	65
																			10 W.	266,693	234,196	248,089	32	10
												MFR.	5 1/2"	"	2 1/2"	"	"	"	0 W.	234,271	244,376	248,298	36	3
6A	1	H	18000	608 A	2500'	2	"	6/19 SEALE REGULAR 1-9-9 1-.102" 9-.043" 9-.083"	J	Y=	625.00	NO LABORATORY DATA AVAILABLE													
28	1	G	20376	904-B	2500'	2	"	6/19 SEALE REGULAR 1-9-9 1-.095" 9-.043" 9-.082"	J	"	625.00	LOCAL	6 1/2"	RIGHT	2 3/8"	LEFT	MANILA	RIGHT	(1 W.	236,882	203,140	222,137	31	56
																			10 W.	235,776	211,527	222,936	32	8
												MFR	6 1/2"	"	2 3/8"	"	"	"	(WAOW	232,000	221,000	228,000	27	45
4	1	B	21,978	112-S	2500'	4	"	6/25 SEALE MODIFIED 1-6-6-12 1-.0715" 6-.065" 6-.028" 12-.065"	J	"	625.00	LOCAL	7"	RIGHT	2 1/2"	LEFT	MANILA	RIGHT	WAOW	249,524	227,454	241,456	30	17
42	1	E	29,261	1749	2500'	4	"	6/25 SEALE MODIFIED 1-6-6-12 1-.070" 6-.065" 6-.028" 12-.065"	J	"	625.00	LOCAL	5 7/8"	RIGHT	2 1/2"	LEFT	MANILA	LEFT	WAOW	268,501	243,604	250,759	32	27
																			FILLERS	334,942	283,196	311,254	34	223
												MFR.	4 1/4"	"	2 1/2	"	"	"	O.W.	265,000	221,000	246,000	35	
48	2	J	24,497	1618	1150'	1	IMP PLOW	6/19 WARRINGTON 1-6-6/6 1-.071" 6-.070" 6-.074" 6-.056"	H	0.35	402.50	LOCAL	9 1/4"	RIGHT	2 1/2"	LEFT	MANILA	LEFT	WAOW	278,294	216,691	260,252	32	20
												MFR.	5 1/2"	"	2 3/8	"	"	"	WAOW	276,000	244,000	261,000	31	
44	2	J	21,724	1523-2	1150'	2	"	6/19 SEALE REGULAR 1-9-9 1-.102" 9-.043" 9-.083"	H	"	402.50	LOCAL	6 1/2"	RIGHT	2 3/8"	LEFT	MANILA	LEFT	1 W.	273,478	248,499	261,296	33	66
																			0 W	286,972	258,255	277,453	29	7
												MFR	6"	"	3"	"	"	"	(W.	267,000	253,000	261,000	37	
61	3	L	38231	1866	1350'	3	"	6/21 SEALE MODIFIED 1-5-5-10 1-.055" 5-.074" 5-.032" 10-.074"	H	"	472.50	LOCAL	7 1/4"	RIGHT	2 1/2"	LEFT	MANILA	LEFT	WAOW	265,814	262,472	255,033	31	10
																			FILRS	322,139	282,338	300,413	32	87
												MFR	6 1/4	"	3"	"	"	"	WAOW	260,000	238,000	244,500	30	
19	1	F	27,440	681	2500'	3	"	6/21 SEALE MODIFIED 1-5-5-10 1-.053" 5-.071" 5-.031" 10-.074"	H	"	874.00	LOCAL	6 7/8	RIGHT	2 1/2	LEFT	MANILA	LEFT	1 W.	279,012	243,016	265,809	34	11
																			FILLERS	232,866	287,963	272,722	35	154
																			O W	273,376	241,724	256,571	33	12
63	2	B	417594	234-B	1250'	4	"	6/25 SEALE MODIFIED 1-6-6-12 1-.078" 6-.072" 6-.025" 12-.072"	H	"	437.00	LOCAL	6 1/2"	RIGHT	2 3/4"	LEFT	MANILA	RIGHT	1 W.	272,220	248,452	264,348	37	15
																			O.W.	283,527	260,728	266,400	36	14
20A	1	K	19000	1474	2500'	4	"	6/25 SEALE MODIFIED 1-6-6-12 1-.070" 6-.065" 6-.028" 12-.065"	H	"	874.00	NO LABORATORY DATA AVAILABLE													
31	3	K	20465	1222-3	2500'	4	"	6/25 SEALE MODIFIED 1-6-6-12 1-.070" 6-.065" 6-.028" 12-.065"	H	"	874.00	LOCAL	6 1/2"	RIGHT	3"	LEFT	MANILA	LEFT	WAOW	289,290	253,144	270,681	37	22
																			WAOW	271,000	252,000	261,000	36	
												MFR.	6"	"	3 3/8"	"	"	"	FILLERS	241,000	209,000	224,000	36	
4A	1	C	11000	271-2	2500'	3	"	6/27 SEALE MODIFIED 1-9-9 1-.032" 9-.043" 9-.083"	H	"	874.00	NO LABORATORY DATA AVAILABLE													
138	2	D	46710	605-A	1150'	7	"	6/25 FLATTENED STRAND 1-12-12 1-▽? 12-.043" 12-.0725"	H	0.49	587.00	NO LABORATORY DATA AVAILABLE													

cator are shown in Figure 3. These 24-hour charts indicate to the initiated just what principal operations occurred during the periods. Aside from showing the tension on the casing line at all times, these charts permit one to determine how many times each day the drill pipe was pulled out of and run into the hole.

Common parlance is to call one "pull out" and the subsequent "run in" a "round trip". The records show how many round trips of the pipe were made and at what times. From the time at which these occurred, the corresponding depths of the hole can be determined by reference to the driller's log. The weights handled can be quite accurately determined from the calibration charts furnished with each instrument, but if the depth of the hole, the weight per foot of the drill pipe, and the weight of the elevators, hook and blocks are known, the approximate work transmitted by the line can be determined directly from a simple chart with sufficient accuracy for the problem at hand.

Although every progressive operator should appreciate that the installation of a recording weight indicator in each rig is an excellent investment, this on account of the fund of valuable general information which it gives to the drillers and to the management concerning the drilling operation, its use is not essential to the successful application of the present-described method to evaluate

Rope Casing Lines. Seven Plow and Nine Types Compared

the Same Lines, Line Numbers Being Given in Left Hand Column)

FIELD SERVICE

LINE No.	WELL NAME	DATE INSTALLED	INDIVIDUAL SECTION DEPTH FROM	DEPTH DRILLED TO	LENGTH CUT	ROUND TRIPS	SIZE OF PIPE	No. OF LINES	SERVICE DATA DIA. OF DRUM	CROWN BLOCK TYPE	CROWN BLOCK DIA. SHEAV.	TRAVEL BLOCK TYPE	TRAVEL BLOCK DIA. SHEAV.	TON MILES	COST PER TON MILE	TOTAL TON MILES	SERVICE COST PER TON MILE	REMARKS
57	Cr. 10	6-15-27	4173'	4889'		24	5"		20"	A	24"	H(RB)	36"			1243	0.2660	
13	Co. 1	5-29-27	3514'	4050'		34	5"		16"	F(RB)	30"	J(RB)	32"			3502	0.1778	LOWEST COST
1	E. 18	8-19-27	3290'	4590'	1000'	56	6⅝5"	8	14"	A	24"	J(RB)	32"			2313	0.2700	
6A	T. 17	3-17-27	3640'	4485'	450'	35	5"		14"	A	24"	H(RB)	36"	1526				
	E 10	5-30-27	3085'	4485'		29	4"		14"	A	24"	H(RB)	36"	1032		2558	0.2450	
28	E 14	7-5-27	5495'	6265'	1100'	34	4"		14"	A	24"	H(RB)	36"	2214				
	G 24	8-27-27	0	2436'		64	6⅝6"		16"	A	24"	"	36"	454		2668	0.2342	
4	T 19	4-4-27	96'	4245'	800'	119	6⅝5"		18"	A	24" & 30"	H(RB)	36"			2508	0.2395	
												J(RB)	32"					
42	T 21	6-22-27	4339'	5240'	1000'	46	5"		16"		24"	H(RB)	36"	2709				
	E 18	7-11-27	86'	2300'			6⅝6"		14"	A	24"	J(RB)	32"	399		3102	0.2050	
48	Cr. 8	4-24-27	2827'	3555'		50	5"		18"	A	24"	H(RB)	36"			1432	0.2005	
44	Cr. 10	5-19-27	3506'	4173'		32	5"		20"	A	24"	H(RB)	36"			1247	0.3230	
61	Pu. 2	7-20-27	5256'	3414'		44	3"	8	18"	A	24"	H(RB)	36"			2006	0.2282	
19	E 15	6-18-27	4476'	5357'	300'	67	4"		16"	A	24"	H(RB)	36"	3641				
	T 22	8-21-27	73'	2675'		75	6⅝6"		20"	A	24"	"	36"	590		5881	0.2205	
63	Cr. 11	9-16-27	2825'	3459'		33	5"		16"	A	24"	H(RB)	36"			923	0.4745	HIGHEST COST
20A	E 11	2-26-27	3993'	4300'	800'	65	5¾4"		14"	A	24"	J(RB)	32"			2498	0.2500	5/8" Rope Lay (Apparently too stiff)
31	F 5	3-30-27	4423'	5210'		54	4"	8	18"	A	24"	H(RB)	36"	2438				6 Rope Lay
	O 10	6-10-27	3580'	4120'		26	3"	6	18"	A	24"	H(RB)	36"	843		5281	0.2665	(Compare with Line above)
4A	E 6	12-8-26	3638'	4359'	1000'	104	6⅝5"		14"	A	24"	"	36"			3720	0.2355	
138	A 18	9-6-27	3520'	3625'		9	3"		18"	A	24"	H(RB)	36"	430				
	A 24	10-3-27		935'		9	5"		18"	J(RB)	40"	J(RB)	32"	36				
	"	10-24-27	935'	3302'		52	6"		18"	J(RB)	48"	"		1171		1637	0.3181	

SERVICE COMPARISON

wire line service costs. Although probably not as reliable, to require the drillers to write in on their daily drilling logs the number of round developed for any other average conditions which may exist in the operations of a particular district. Similar curves, not shown, have been developed to calculate the work transmitted to set strings of casing by means of the following formula:

Ton Miles per String = L (20,000 + wL) ÷ 21,120,000 where

L = length of string of casing in feet, and

w = weight per foot of casing.

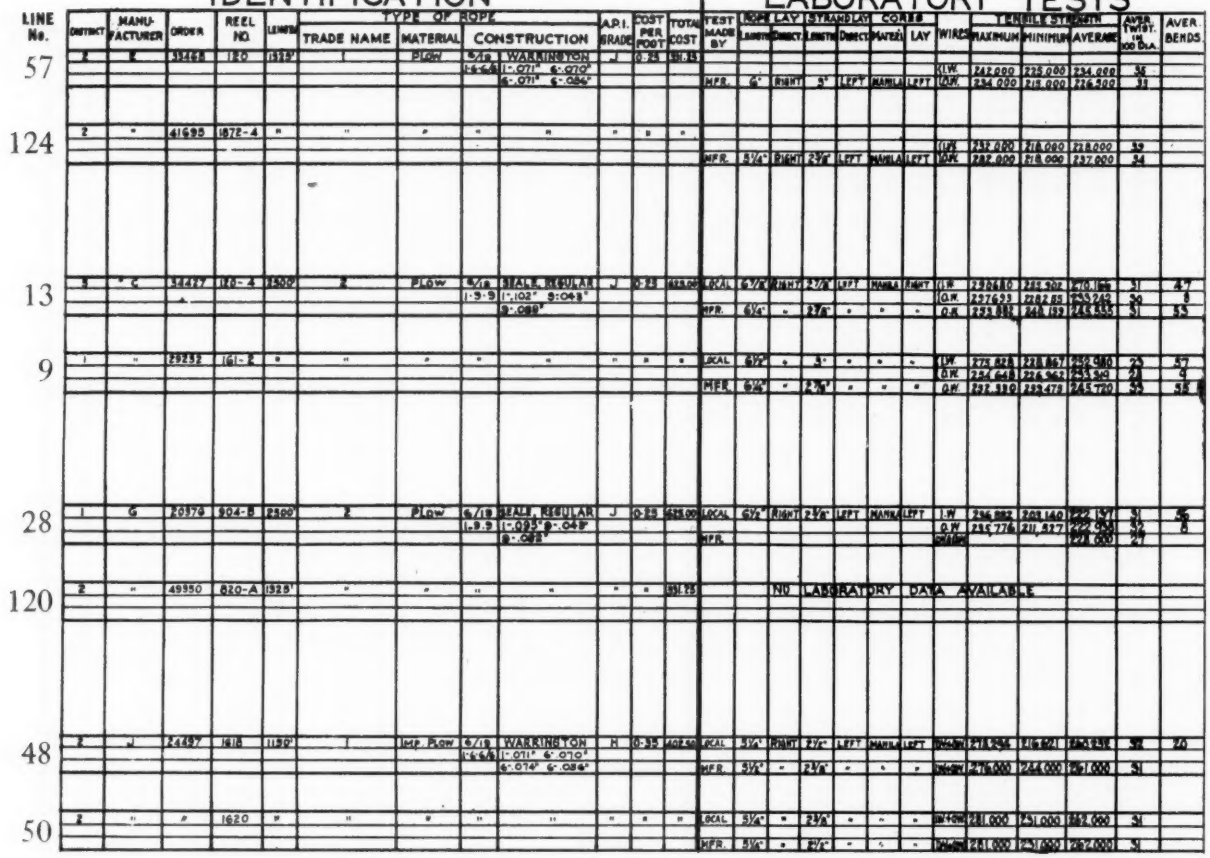
The chart and formula show the work transmitted during each round trip only. From the number of round trips made each day and the depths at which each occurred, the total work transmitted each day may be clculated. A brief example is given below of the calculation of the ton-miles of service rendered by a casing line over a ten-day period:

Drill pipe used: 6⅝-inch 25.2 lb. A.P.I.

Date new line put on: Feb. 8.

Figure 7. Typical Records of One Inch Wire Small and New Large Shea

(Note: Identification, Laboratory and Field Service Tests Are On



LINE No.	IDENTIFICATION											LABORATORY TESTS														
	DISTRICT	MANUFACTURER	ORDER	REEL NO.	LENGTH	TYPE OF ROPE: TRADE NAME	MATERIAL	CONSTRUCTION	A.P.I. GRADE	COST PER FOOT	TOTAL COST	TEST MADE BY	ROPE LAY: LENGTH	ROPE LAY: DIRECT.	STRAND LAY: LENGTH	STRAND LAY: DIRECT.	CORE: MATERIAL	CORE: LAY	WIRES	TENSILE STRENGTH: MAXIMUM	TENSILE STRENGTH: MINIMUM	TENSILE STRENGTH: AVERAGE	AVER. TWIST vs. 100 D.A.	AVER. BENDS
57	2	E	32468	120	1325'	1	PLOW	6/18 WARRINGTON 1-6-6 1-.071" 6-.070" 6-.071" 6-.086"	J	0.25	331.25													
												MFR.	6"	RIGHT	3"	LEFT	MANILA	LEFT	KW	242,000	225,000	234,000	36	
																			OH	234,000	218,000	226,500	31	
124	2	"	41695	1672-4	"	"	"	"	"	"	"															
																			KW	232,000	218,000	218,000	39	
												MFR.	5¼"	RIGHT	2⅞"	LEFT	MANILA	LEFT	OH	282,000	218,000	237,000	24	
13	2	C	34427	170-4	2500'	2	PLOW	6/18 SEALE REGULAR 1-9-9 1-.102" 9-.048" 9-.088"	J	0.25	625.00	LOCAL	6⅞"	RIGHT	2⅞"	LEFT	MANILA	RIGHT	KW	230,680	222,502	226,196	31	4.7
																			OH	237,693	220,285	229,242	30	8
												MFR.	6¼"	"	2⅞"	"	"	"	OH	243,882	240,193	242,035	31	55
9	1	"	29232	161-2	"	"	"	"	"	"	"	LOCAL	6½"	"	3"	"	"	"	KW	228,828	228,867	228,980	25	57
																			OH	234,648	226,962	230,305	28	4
												MFR.	6¾"	"	2⅝"	"	"	"	OH	237,310	233,479	235,770	35	55
28	1	G	20379	904-B	2500'	2	PLOW	6/18 SEALE REGULAR 1-9-9 1-.095" 9-.049" 9-.092"	J	0.25	625.00	LOCAL	6½"	RIGHT	2⅝"	LEFT	MANILA	LEFT	KW	236,882	208,140	222,191	31	36
																			OH	255,776	211,527	233,651	26	8
												MFR.							[illegible]			238,000	27	
120	2	"	49350	820-A	1325'	"	"	"	"	"	331.25	NO LABORATORY DATA AVAILABLE														
48	2	J	24497	1618	1150'	1	Imp. Plow	6/18 WARRINGTON 1-6-6 1-.071" 6-.070" 6-.074" 6-.086"	H	0.35	402.50	LOCAL	5¼"	RIGHT	2⅞"	LEFT	MANILA	LEFT	[illegible]	278,554	216,921	247,238	32	20
												MFR.	5½"	"	2⅝"	"	"	"	[illegible]	276,000	244,000	261,000	31	
50	2	"	"	1620	"	"	"	"	"	"	"	LOCAL	5¼"	"	2⅝"	"	"	"	[illegible]	281,000	251,000	262,000	31	
												MFR.	5¼"	"	2⅞"	"	"	"	[illegible]	281,000	251,000	262,000	31	

SUMMARY OF ABOVE

Casing Line Identifications	Costs Per Ton Mile of Service Rendered 24" Plain Block	48" Special Block
E-1 Plow	.2660	.1431
C-2 Plow	.1784	.1202
G-2 Imp. Plow	.2343	.1121
J-1 Imp. Plow	.2805	.1900
Totals	.9592	.5654
Averages	.2398	.1413

$$\frac{.2398 - .1413}{.2398} = 40.7\%$$

Decrease in Wire Rope Service Costs effected by use of large Crown Block Sheaves

This line was not worn out after ten days of service, but the example is curtailed for the sake of brevity. The last ten-day period of service of the same line, rendered while continuous coring and reaming was in progress at a greater depth, is shown on Page 63.

Drill pipe used: 6⅝" 25.2 lb. A.P.I.

By comparison with the first ten-day period shown on Page 57 it will be noted that during the last ten-day period the line transmitted almost ten times as much work to raise and lower the drill-pipe, elevators, blocks and hook. The futility of an attempt to use "days of service" as a basis of comparison is clearly evident.

Let it be assumed that the above line was a 2500-foot plow steel casing line which cost $0.25 per foot or $625.00 for the whole length. Assume that the total service rendered or work transmitted by the line prior to its removal was 3125 ton-miles. Then the cost per ton-mile of the service rendered by this particular line can be evaluated in terms of cents per ton-mile as follows:

Cost per ton-mile of service rendered

$$= \frac{\text{Cost of line}}{\text{Ton-miles service}} = \frac{\$625.00}{3125} = \$0.20,$$

or 20 cents per ton-mile. Thus a method is developed to compare the practical values of various wire rope casing lines on the basis of the cost of the service rendered.

Complete service data which should be taken during the run of the line in the field are as follows:

Well at which line is installed.
Date line is installed.
Depths drilled, from ——— to ———
Total number of round trips of drill pipe.
Size of drill pipe hoisted and lowered.
Number of lines strung in blocks.
Diameter of draw-works drum.
Type of crown block and sheave diameters.
Type of traveling block and sheave diameters.
Ton-miles of service rendered.
Cost per ton-mile of service rendered.

In drilling deep wells it is often

Rope Casing Lines. Service of Four Types on ve Crown Blocks Compared

the Same Lines. Line Numbers Being Given in Left Hand Column)

FIELD SERVICE

LINE No.	WELL NAME	DATE INSTALLED	INDIVIDUAL SECTION SERVICE DATA: DEPTH DRILLED FROM	DEPTH DRILLED TO	LENGTH CUT	ROUND TRIPS	SIZE OF PIPE	NO. OF LINES	STAND OF DRILL	CROWN BLOCKS TYPE	CROWN BLOCKS DIA. SHEAV.	TRAVEL BLOCK TYPE	TRAVEL BLOCK DIA. SHEAV.	TON MILES	DOLLARS PER TON MILE	TOTAL TON MILES	SERVICE COST PER TON MILE	REMARKS
57	Cr 10	6-15-27	4173'	4889'		24	5"		20"	A	24"	H(RB)	36"			1243	0.2660	
124	Cr 9	8-13-27	4672'	4998'		23	5"		16"	J(RB) -DD-	48"	J(RB)	32"			2332	0.1431	BAD FISHING JOB
			1052'	2902'		54	5"											
13	Co 1	5-29-27	3514'	4050'		94	5"		16"	F(RB)	30"	J(RB)	32"			3503	0.1784	ON HILO DRIVE
9	T 19	6-11-27	4225'	6360'		94	4"		18"	J(RB) -DD-	48"	J(RB)	32"			9197	0.1204	
28	E 14	7-5-27	5495'	6765'	1100'	34	4"		14"	A	24"	H(RB)	36"	2214				
	G 24	8-27-27	0'	2636'		64	4½"					H(RB)	36"	454		2668	0.2342	
120	Cr 9	10-6-27	3066'	5100'		96	5"		16"	J(RB) -DD-	48"	J(RB)	32"			7249	0.1121	
48	5	4-24-27	2827'	3855'		50	5"		18"	A	24"	H(RB)	36"			1432	0.2805	
50	Cr 9	4-15-27	0'	861'		26	8"		16"	J(RB) -DD-	48"	J(RB)	32"			8122	0.1900	FISHING JOB
			861'	2817'		35	6"											
			2817'	3618'		51	5"											

SERVICE COMPARISON

considered economy to purchase long lines, say 2500 feet in length. These are spooled on the draw-works hoist so that about one layer and four wraps are on the drum when the blocks are at lowest position, the blocks are strung up, and the balance of the line is kept spooled in reserve on the calf-wheel. This latter serves to store the extra line conveniently and to give an emergency means of hoisting in case the rotary drilling engine should fail. After the section of the line nearest the drum becomes crushed and wickered (usually from 300 to 800 feet), it is cut off and removed, and an equal amount is spooled off of the calf-wheel hoist, through the blocks and onto the drum. It is advisable to so arrange the service records that data on each section of long lines can be segregated. The same suggestion applies when one line is used at two or more wells.

In order that other operating companies may judge for themselves the merit of the method described in this paper, and use it to their own advantage if they see fit, it is deemed advisable to disclose certain typical records already obtained by its use. Information as regards identification and actual net costs per foot must be ethically withheld as confidential.

The identifications of manufacturers and trade names will be withheld by the use of a code, and the net prices will be withheld by pricing all plow steel lines at $0.25 per foot and all improved plow steel lines at $0.35 per foot. Makes of crown and traveling blocks will be withheld, except that

CALCULATION OF WORK IN TON-MILES (TON-MILES PER ROUND TRIP TAKEN FROM CHART IN FIGURE 4)

Date 1927	Number of Round Trips	Average Depth-Ft.	Ton-miles per Round Trip	Ton-miles for Day
Apr. 27th	5½	3150	30.0	165.0
Apr. 28th	3½	3175	30.5	106.7
Apr. 29th	4½	3215	31.2	140.8
Apr. 30th	5	3265	32.1	160.5
May 1st	4½	3310	33.0	148.5
May 2nd	4	3350	33.6	134.4
May 3rd	3½	3380	34.2	120.0
May 4th	4½	3420	35.0	157.5
May 5th	4½	3455	35.6	160.0
May 6th	3	3480	36.1	108.3
Total Ton-miles of service for Ten-day period—				1401.7

same are marked (RB) in the figures when they are of the roller-bearing type. All other data given are those actually obtained from manufacturers, local laboratories, and field records. The total ton-miles are those actually calculated for the individual lines, though the total costs per ton-mile are necessarily altered to be consistent with minor changes made to withhold the net prices per foot of the competitive brands. The records are shown in Figures 5, 6 and 7, each selected from the lot of about 150 on hand to illustrate three different points.

Figure 5 shows the records, selected at random, of six each of four types (brands) of lines. These are so presented to show the generally consistent results which the method gives. For example, the first group of six C-2 plow lines were run in four different districts some 500 miles apart, some on steam driven rigs and some on an electric Hild-drive rig, with various depths of hole, sizes of drill pipe, numbers of lines in blocks, and diameters of drums and sheaves. One line was only about half the lengths of the other five, and yet the total range of cost per ton-mile of the six lines was only about 15 per cent above or below the average. Lines 8, 13, and 72 were run consecutively on the same well, and the consistent increase in service cost with increasing depth of hole might lead to the conclusion this was a parallel to be expected normally. These lines were of regular Seale construction.

The third group of six F-3 improved plow lines were run in three different districts, two lines were 1325 and 1500 feet in length while the other four were 2500 feet long. They were run under various conditions of depth of hole, size of pipe, diameters of drum and sheaves, etc., and yet the costs per ton-mile ranged only between $0.2175 and $0.2495 for the six lines. Almost equally as consistent results appear in the fourth group of six J-4 improved plow lines where the costs per ton-mile ranged from $0.2140 to $0.2675. Both groups of lines were of Seale construction, modified with filler wires.

The only apparently inconsistent results are to be found in the case of the second group of six E-1 plow lines, i. e., the low service costs of lines 59 and 60 and the high cost of line 53. In this group the cheapest service was obtained where the lines were run on large-diameter drums. In the case of the inconsistent high service cost of line 53, there is the possibility that the driller removed the line before it was worn out, perhaps to put on a new line to run a heavy string of casing. These lines were of regular Warrington construction, which same does not appear to be as satisfactory as the regular Seale for this service.

By averaging the costs of each group or brand of lines, fairly accurate comparative service costs may be obtained, and the operator can draw his own conclusions as to which lines will give him the most service per dollar invested. Figure 6 gives typical records of seven brands of plow lines and nine brands of improved plow lines. Each record was a test of a particular individual line, but in each case the individual line was chosen which had a cost per ton-mile very nearly equal to the average cost for all lines of that brand.

With these averages, ranging from $0.1778 to $0.4745, available for study, the manager now has at least a good approximate answer to his question—"How much service did this brand of wire rope give per dollar invested?"

Figure 7 is presented to show how the "other influencing factors" may be evaluated approximately after some reasonably consistent basis of comparison is established. The particular factor considered is the effect of crown block design. The majority of the 150 lines purchased were run on old-style crown blocks, with 24-inch sheaves. Several lines recently have been run on a new type of crown block with 48-inch sheaves. Figure 7 shows the service records of the average lines of four types (brands) run normally on 24-inch sheave crown blocks, each in turn compared with the service record of the average line of similar type (brand) run on the 48-inch sheave crown blocks.

The average of the costs per ton-mile of service for all lines run on the 48-inch sheave crown blocks was 40.7 per cent less than the average of the service costs for all similar lines run on the old-style 24-inch sheave crown blocks. If for the sake of conservatism this apparent increase was assumed to be only 20 per cent, an operator who now purchases $100,000 worth of wire lines per year can effect an annual saving of $20,000 by changing over his crown block sheaves to the larger size with an initial expense probably not to exceed from $7,000 to $10,000, if reasonable salvage is credited for the old blocks.

Inasmuch as crown blocks have a long service life the entire annual saving should be effective for several years following. It has long been conceded as reasonable that the use of larger sheaves should increase the service to be expected from oil country wire rope but, as a rule in the past, neither this important increase nor the particular effect of any other minor equipment change could be demonstrated to the manager with information expressed in terms sufficiently concrete to definitely substantiate a request by the drilling department for the capital expenditure necessary to make general installations of the improved equipment in all rigs.

All of the necessary data on the wire rope service of an operator who now spends $100,000 for wire ropes each year can be collected and correlated by a competent field man with an expenditure of $1,000 worth of his time. The opportunities for substantial savings in wire rope service costs by improved methods of wire rope selection far outweigh the almost negligible costs of the effort.

The present general unsatisfactory condition will never be corrected, and the value of the various equipment changes and the competitive wire ropes will never be determined even with reasonable approximation in dollars and cents until the operator adopts this or develops some other practical method to evaluate wire rope service.

More Political Tinkering Seen by Attorneys

CHICAGO, Dec. 8.—Three legal discourses on the subject of "Government Regulation" were delivered in one of the group meetings on the last afternoon of the American Petroleum Institute meeting.

Belief that the problem of governmental interference in the oil business is going to get worse instead of better was expressed at the close of the meeting by W. C. Franklin, Tidal Oil Co., who presided. The papers were by T. K. Schmuck of The Texas Co.; W. T. Holliday of Standard Oil Co. of Ohio, and Edwin S. Hall, Standard Oil Co. of New Jersey. Mr. Schmuck spoke first.

Because his subject confined him closely to the topic of federal regulation, Mr. Schmuck's paper contemplated control of production chiefly. He is opposed to it, believing that the oil industry is able to manage the matter of regulating production profitably to itself and equitably to the public if left alone to do the job unhampered. He cited a wealth of legal precedent to support his contention that the lowest price the government may be able to procure at times is not necessarily the most advantageous price for the citizen.

Mr. Holliday related state and municipal regulations of oil marketing in Ohio. He expressed the belief that nowhere had state and city tinkering with oil business been more capricious than in Ohio.

Mr. Hall told of his experiences with state officials, mostly governors and attorneys general, over a period of years in the states of the Atlantic seaboard. His last account was of the Tennessee price control case which is now held inoperative by an injunction of the federal court. He expressed the opinion privately that this case, started by the late Governor Austin Peay to make gasoline a public utility, will not be abandoned by the state administration but will finally reach the Supreme Court of the United States.

Saving Money and Loss of Production By Proper Care of Gas Engines

By John Reid*

Presented before American Petroleum Institute at Chicago, Dec. 5-8

IN PURCHASING an engine the buyer purchases horse power. That he is purchasing power must be his primary consideration and with this in mind he must analyze his lease conditions very thoroughly, so that he may assure himself of the purchase of sufficient power to efficiently meet his requirements.

An engine is built for use, not abuse. It cannot adapt itself to conditions which it is not built to meet and therefore machinery must be purchased immediately capable of meeting and overcoming the conditions of service and operation.

This paper is directed toward the operation of an engine to be used in the service of pumping—individually and in multiple.

The power needed to pump a well is a vague quantity. It is only in certain established fields that the quantity of power required is known and many factors, ordinarily unconsidered, go to make up power requirement conditions far in excess of the power needed to merely actuate the rods and fluid.

With the advent of rotary tools holes are not so straight, which means very often that the sucker rods must pull around bends, with a friction out of all proportion to the power requirements necessary to lift the fluid. Data collected has shown that on some leases there exists a difference of 4000 pounds starting load on wells of equal depths and tubing diameter.

Considered with immediate requirements must be the thought of the future work of the engine. This is especially necessary in fields where the wells flow for a period. When the wells cease to flow the engine is put on one of the hardest jobs it will have. The chances are that, while the wells were flowing, it has had but little use and just as little care and yet it is put under the very difficult strain of swabbing and, when this has been accomplished, it is put on the beam and expected to deliver full service, sometimes when 60 per cent of the fluid is water, and to deliver this service when it is practically worn out through slight care followed by a period of very strenuous service in swabbing. It is imperative that this be taken into account at the time of purchase of the engine.

Points to Heed

Summary of Mr. Reid's paper on Use and Care of Gas Engines.

1—Choose the engine with a knowledge of operating conditions to which it will be subjected.
2—Keep outer bearing aligned.
3—Keep bearings snug.
4—Belt correctly.
5—Use suitable oil.
6—Cool properly.
7—Clean regularly.
8—Inspect often.

Other things to be considered are the altitude; the kind of gas, whether casing head, sulphur or thin gas; the British thermal unit value of the gas. All these things must be considered and known by the buyer so that he may be able to state his needs to the manufacturer who has but little knowledge of the buyer's specific operating conditions.

After the buyer has purchased and received an engine of sufficient power to meet his demands, its installation is a matter of primary importance. If the installation is left to the supply company the buyer should have a competent inspector pass upon the work and see that it is properly done and in all ways satisfactory.

BLUE prints or a templet or both are furnished with the engine for setting. I believe the best setting for an engine to be a concrete block on which the engine is set, leveled and lined up properly. The engine should then be thoroughly grouted in. Some engines have grout holes left in the bed, so that the engine will set close to the concrete. The dam for the grouting should be high enough to raise the grout one-half inch or more up into the bed. The outerbearing should be set in the same way. In such a grout it is usual to use a quick set.

Wood blocks are hard to keep lined, oil soaks under, and it becomes hard to keep the engine on them.

Gas lines should be of ample size to allow an easy flow of gas at low pressures and it is desirable to have the air received through a strainer so that dust and foreign matter may be removed as far as possible.

Water circulation and lubrication are subjects of paramount importance and the owner must give particular attention to both.

The tanks should be large and the installation designed to insure a continuous flow of water at all times.

Plate 1. A shows the thermo-syphon cooling system. It is to be noticed that the discharge pipe is under the surface of the top level of water. The difference in weights between the hot and cold water gives a ready circulation at all times but, to insure proper operation of this system, the discharge pipe must be kept beneath the top water level.

A natural phenomena with which we are all familiar will serve to illustrate the reason for this. We have all noticed the bubbles which form on the bottom of a pan of water when the boiling point is reached. Under these bubbles is a pocket of air which serves as an effective insulation and prevents the mass of water coming in contact with the metal.

THE same thing happens in an engine and the water, instead of bringing a uniform cooling surface to the cylinder, will defeat its own purpose if the discharge pipe of the thermo-syphon system is exposed above the water. The syphon system is impaired and sufficient water will not flow to bear upon all parts of the cylinder. Violent ebullition takes place, the steam condensing at the mouth of the discharge pipe flows back into the jacket to be again converted into steam which is belched violently from the pipe in both directions.

Cracked cylinders are certain to result from the action of the cold water coming from the tank and striking the cylinders after belching has taken place. Now, a check valve inserted between the tank and the intake of the cylinder will prevent the belching from exhausting through the intake pipe. It will also serve to keep some water in the jacket and when the

*Joseph Reid Gas Engine Co.

flow is resumed after the ebullition there will be no violent contact between cold water and hot cylinder wall.

Note that the side of the tank has an overflow from the bottom so that the heavy water is discharged with the addition of fresh water. The tank should always be filled from the top and drained from the bottom.

B on Plate 1 shows the set up for the centrifugal pump. Note that the discharge pipe may be over the top of the tank, that there is the same waste system and check valve. In fact, the installation is practically the same as Type A so that continuous flow is insured.

Of major importance the matter of lubrication takes place beside that of the cooling system. Engineers in charge of prime movers should acquaint themselves with the quality and quantity of the oil used. Companies who are both producers and refiners generally send to their own refineries for oils and it often happens that they choose an oil entirely unsuitable to their needs when they could as well have one suitable. Here a better understanding must be had between those in charge of producing and refining so that suitable oils may be obtained.

As to the uses of the gas engine—the widest uses in the oil fields are on the individual pumping well and the pumping of wells in multiple by the use of a power.

Related to the pumping of the well on the beam there first comes the swabbing. This is one of the most grievous punishments to which the gas engine is put. It is run at top speed, the swab jerked suddenly and dropped into the hole, often taking far more fluid than it should and in this manner bringing a sudden strain on the engine, sufficient to collapse the derrick and casing at times.

PULLING rods and tubing presents another problem of abuse to the engine. The engine is run hard and very often at top speed with no load. The operator will throw out the clutch and make no attempt to throttle the engine, thus allowing it to run at full speed which literally lets the engine tear itself to pieces.

When applied to the beam, if the engine has had previous service and good care, it only consumes about one-half its horsepower capacity and will give years of satisfactory service if properly cared for. It is much easier on all equipment if the pulley ratios are balanced and the owner will find doing this a very profitable investment.

In multiple or power pumping we recommend the four cycle type of gas engine. There must be close enough governing of the engine to care for a wide fluctuation of load. The flywheels must be heavy enough to carry over the peak and steady

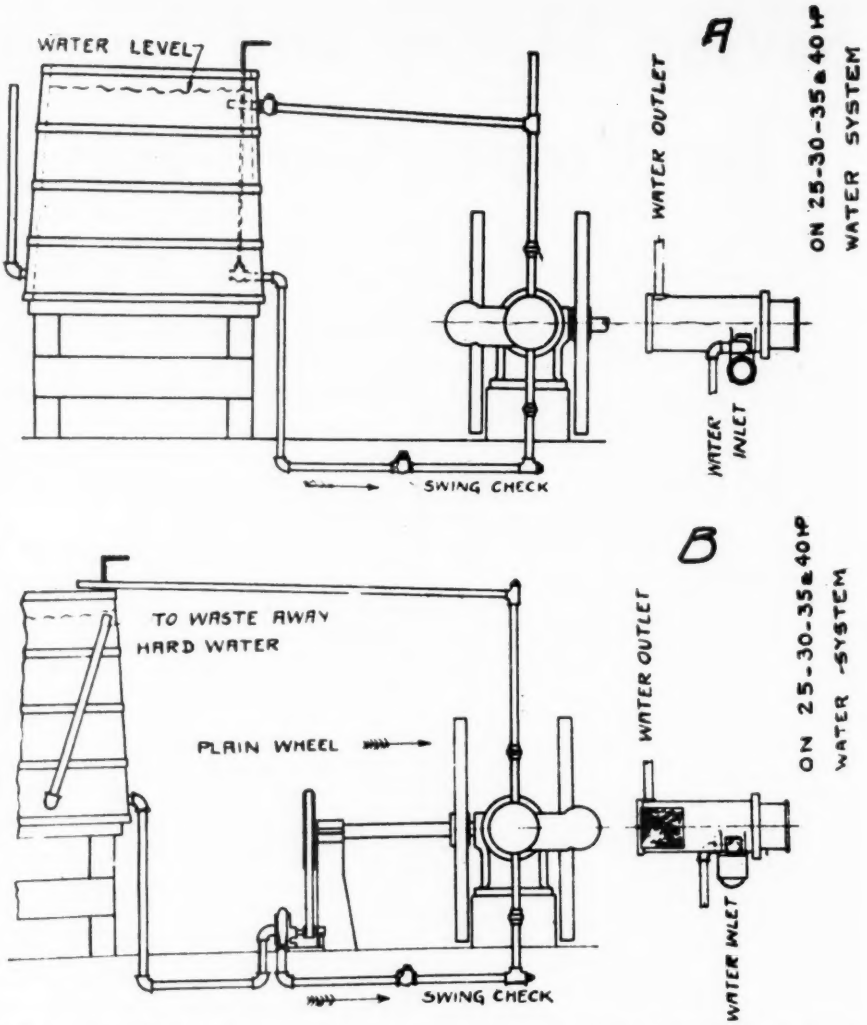


Plate 1—(A)—Efficient arrangement of thermo-syphon cooling system for gas engine in pumping service. (B) Set up for the centrifugal pump

the engine during the unbalanced cycle or during a period of no load. The engine mechanism should be balanced so as to prevent a racing cycle.

Before making specific reference to the care of a gas engine, I wish to make an observation covering some tabulated engine trouble reports which have come to my attention. One report covers 500 engines operating 2023 wells for one month. Out of 194 shut downs, ranging from one to 48 hours, there was only one shut down of one hour to inspect one out of these 500 engines.

It was also observed on one engine that there was a shut down to tighten the bearings. This took three hours and there was no record of the engine having been shut down again to be rebabbitted. There were, however, records of several engines being shut down from 5 to 24 hours to rebabbitt the bearings and on these engines there was no record of the engine having been shut down for inspection or adjustment. Proper care will pay dividends in time, money and production.

Gas engine manufacturers are using the best materials at their command to build their products. However, as with an automobile, the limitations of the materials are soon reached unless proper care is given the mechanism. As with the automobile, so with the gas engine—once the product is purchased the care of it falls upon its owners as must the penalty of neglect.

Before the manual details of proper care can be accomplished it is necessary to instill into the personnel of the lease a correct spirit regarding the attention to be given the engine and the establishment of proper relationship as concerns all immediately connected with the operation of the prime movers in the field. This done, proper care in installation and operation is assured.

Now, as concerns the actual operating care of the engine.

It has been stated that, on installation, the alignment of the engine is important. To keep it aligned is a primary consideration.

Long experience has caused us to develop a device which will test the alignment of the outerbearings. Plate 2 illustrates the use of this apparatus.

The device, which can be carried in

a grip and weighs about 4 pounds is clamped to the shaft with the telescope rod drawn out to extend slightly beyond the diameter of the flywheel.

It is customary to start the test with the crank drawn toward the cylinder as shown on Plate 3. By using the tool steel point as a prick punch, a slight blow will mark the flywheel. Using the point as an indicator the wheel is rolled from one end of the stroke to the other. It is obvious that the measurements must agree from the flywheel to the end of the test bar arm if the bearing is in line. When the bearing is brought into a position at right angles to the center line of the engine the wheels should be turned to a position midway between the ends of the stroke. The bearing must be raised or lowered to make this measurement agree. When the three measurements coincide the bearing is in line.

Misaligned and improperly adjusted outerbearings are certain to result in damaged shafts and destruction of the bearings. With this simple test these may be corrected and trouble avoided.

The journal bearings of the crankshaft demand particular attention. Neglect of these results in costly damage in broken crankshafts and rolled, scored and completely burned out bearings, not to mention the cost in time and loss of production for the installation of a new crankshaft.

Plate 4, fig. 1 shows a crank in normal position in its journal bearings. Fig. 2 shows the bearing illustrating the motion of the shaft when the bearings are loose. A shows the more definite motion of the crank. It pivots at one particular point and thus allows the end to move about in a plane describing a circle. This is further illustrated at B. In a loose bearing the shaft centers change as the bearing becomes worn and the bearing grows larger due to the intense wearing away and rolling out of metal as the strain of the shaft shifts from place to place, rather than being evenly distributed over the entire surface of the bearing. These strains increase as the projected area of the bearing decreases.

THE effect of the crank strain on the journal is shown in Plate 5. Notice how the crank tends to wear into the sides of the bearing box and the strain of the crank as it begins to bend destroys the cap and bearing. The effect on the crank is demonstrated in Fig. 4. This is greatly exaggerated in the illustration, but it is what actually takes place on a small scale. The crank tends to warp and spread, the strains becoming greater and greater until fractures occur either in the arm or the bell at the indicated points.

This may be entirely eliminated by a little attention to the journals. They should be kept snug at all times. If either cap is loose it should have immediate care. The forces leading up to a broken crank accumulate and a crank breaks little by little, over considerable time.

Directly related to outerbearing and crankshaft failure but not ordinarily attributed to it is the problem of the tight belt. I have seen a belt with a 45-foot center support 4 men and be deflected only 3 inches. At the speed belts are run it is readily seen that there is enormous pressure created, disastrous to outerbearings which, as a rule, have light foundations, and to the cranks which suffer directly proportionally with the bearing.

In addition to the effect of tight belts on the crank and bearings it may be said that it causes overheating of the pulley face. This tends to expand it and draw it away from the spokes, causing fractures which destroy the pulley. An instance may be cited where misuse of the belt had wrecked 9 reverse rigs. Upon examination it was found that the operator was using inner tubes as belt dressing and had applied so much that, when the reverse was thrown, the belt could not release but carried through in the same direction but underneath the pulley, thus bringing a strain sufficient to wreck the rig.

Tight belts must be avoided to insure proper service both of engine and belt and, wherever possible, large diameter pulleys should be used in conjunction with wide face belts.

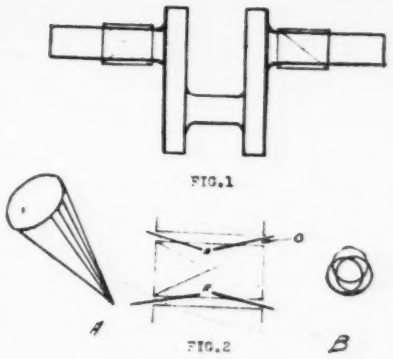
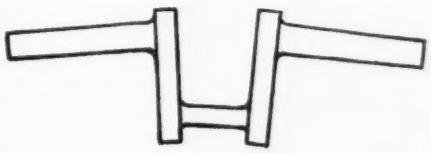


Plate 4—Effect of loose bearing on motion of the crankshaft



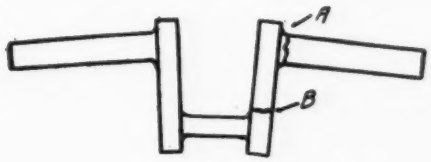


Plate 5—Effect of crank strain on the journal

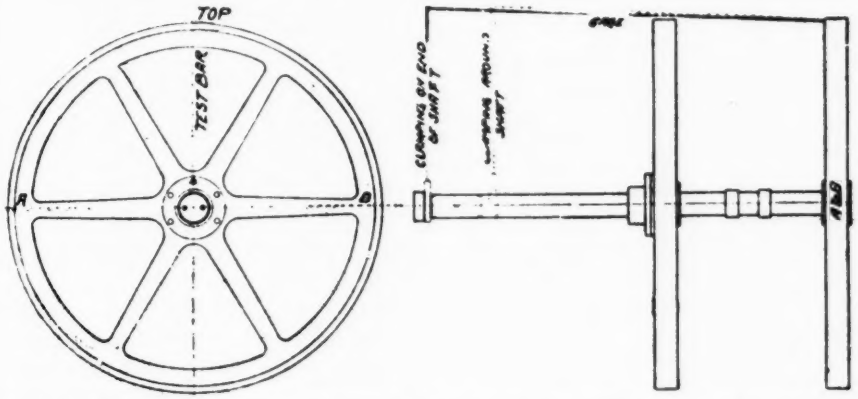


Plate 2—Device developed by Joseph Reid Gas Engine Co., for testing alignment interbearings of gas engine

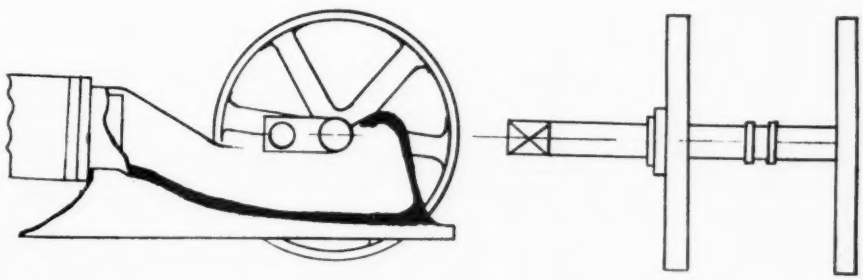


Plate 3—Method of starting the alignment test

The very important matter of lubrication must be given close attention. The table below is herewith given showing the choice of oils which should prove satisfactory in the use of the gas engine.

Too much oil should not be used. It builds up carbon very rapidly in the cylinder and clogs the ports. It will build up underneath the piston rings, causing wear on the cylinder, the piston to seize and the rings to stick and allow the charge to blow past the rings. Cylinders have been known to be worn a quarter inch and still give service, but lack of the proper care in lubrication was eventually costly.

A good grade pure mineral oil should be selected for the engine and the operator should be observing enough to judge the proper amount of oil to give his engine. One 40 horsepower engine on which record has been kept has consumed only one gallon of oil to 600 or 700 horsepower hours and in this case no attempt was made to conserve oil.

Buyers of gas engines have been demanding a splash system on the engine and have been far from favorable to the force feed system. In this connection it is interesting to note that in automotive motors the trend has been more and in the opposite direction, the demand being for the force feed system. It is imperative to watch the oil level closely on the splash system, which requires a greater amount of clean, fresh oil.

Allied to the lubrication system is the cooling system, referred to earlier. Its efficiency depends primarily on its installation. The water itself is another consideration, however. In fields where there is much limestone, gyp deposits in the jacket, impeding the passage of the water and insulating the cylinder wall from the cooling effect of the water.

Treatments for the removal of gyp are matters of common knowledge but attention must be given at all times and in all fields to cleaning the jacket so solid matter will not collect therein. It is a profitable investment to put eaves on the engine house, in regions of hard water, and catch the rain water for use in the engine circulating tank.

	Pennsylvania or Other Mineral Base Oils	Western Oils Asphalt Base
Gravity	25 to 28 Baume	20 Baume
Cold Test		0 Fahr.
Flash	400 to 410 Fahr.	360 to 380 Fahr.
Fire	480 to 490 Fahr.	405 to 425 Fahr.
Viscosity at 100 Fahr.	360 to 370 Saybolt	515 to 570 Saybolt

CLEVELAND, Dec. 10.—An aircraft lubrication department has been created by the Fred G. Clark Co. refiners of HyVis motor oil. Capt. W. B. Ferrier, ex-royal flying corp pilot is in charge.

Misfits in Lease Equipment Avoided by Standards

Staff Special
CHICAGO, Dec. 9

"THERE is no large operator today but who is faced occasionally with the necessity of moving tools from one lease to another, or even from one district to another," pointed out R. A. Wilson, Guiberson Corp., Dallas, in addressing the A.P.I. standardization group conference.

"How frequent have been the troubles caused by this intermingling of tools purchased under different specifications, due either to difference of ideas of different superintendents or due to the fact that many and various small producing or drilling properties have been purchased by a larger company.

"What a series of misfits are thus accumulated! Field machine shops to cope with this situation must have all makes of gages to make one tool fit another or the entire collection of misfits must be all turned to fit the standards used on the property to which they are moved.

"With A.P.I. standards adopted, tools may be moved from Pennsylvania to California or Texas to Wyoming and be fitted into their new companions without delay or machine shop expense. Equipment will never become obsolete for the reason that joints will not fit. Inventories will be reduced and tools will be worn out to the economic limit."

Mr. Wilson also pointed out that it seemed to him the larger manufacturer has the advantage of concentrating on a single standard and also of selling certain parts of his complete equipment to purchasers more flexibly than he could under the old system where his particular type of connection might not interchange with the connection of another manufacturer with which it should operate.

"It broadens his field of selling," Mr. Wilson said, "without in any way interfering with the design of the tool itself. He can sell his grief stem, swivel, tool joint, drill collar or fish tail bit, as the case may be, either as a part or as a unit."

Under the head of actual results obtained from usage of A.P.I. standard taper joints for rotary and cable tool drilling, Mr. Wilson quoted from letters received by J. Edgar Pew, general standardization committee chairman, from a large oil company in the Wyoming district, as follows:

"We have changed most of our drilling tool joints to A.P.I. and will recommend to the management that they change other material over to the A.P.I. as soon as possible. I think it will be a wonderful thing when all the operators have changed over to A.P.I. material. All the changes we have made to date have been very satisfactory."

Here is another from the Wyoming district:

"It may be of interest to you to know that in the Rocky Mountain Division we have changed the greater part of the cable tool joints to A.P.I. standards, and we are changing over all of our equipment as fast as it is practical to do so. All of our cable tools now in use in the Big Horn Basin carry A.P.I. joints."

The following is from a large operator in California:

"Where we use cable tools we use the A.P.I. taper joints."

Here is another from a large operator in Wyoming:

"We have standardized 100% on A.P.I. drilling tool joints both on tools that we purchase and on tools that are made in our own shops."

The following is from a large company in Houston, Texas:

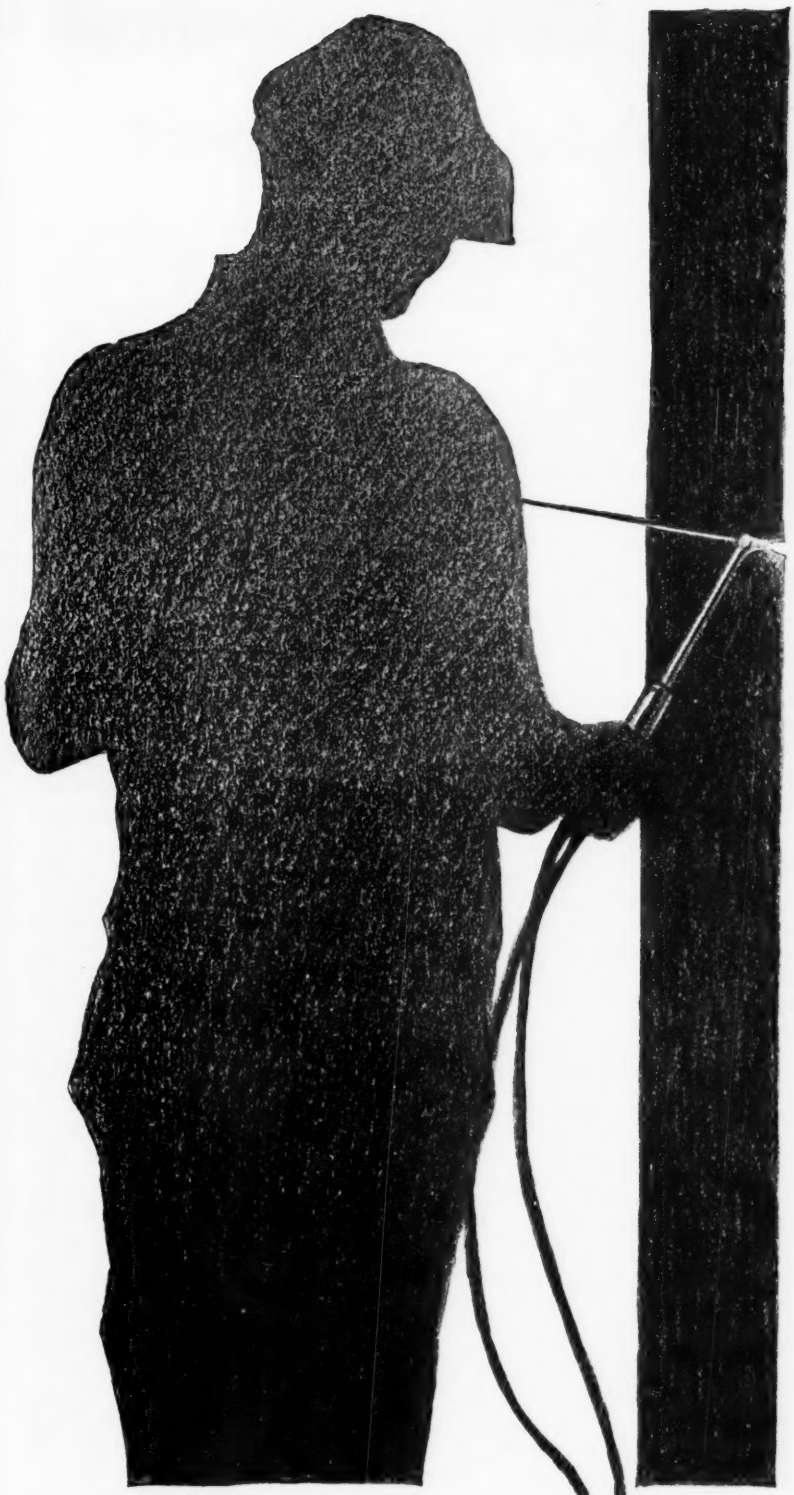
"All new orders placed specify A.P.I. standards."

The following extract from a prominent Eastern manufacturer (not a manufacturer of cable tools) is significant however by way illustrating co-operation. He says:

"Our suggestion to all is 'the quickest way to change over—is to change over', which we did at once."

The following is from one of the largest independent producers in the Mid-Continent:

"We are cooperating in this work to the extent of our ability and will continue to do so, having in mind that this is the one way in which economy can be secured in the purchase and use of oil field material and supplies."



22 years old *but still* Growing

Large volume usually indicates a good product. Certainly this is true of Prest-O-Lite dissolved acetylene which has been used in greater volume year after year for 22 years. Today you can obtain Prest-O-Lite for oxy-acetylene welding and cutting from 119 plants and warehouses.

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DISSOLVED ACETYLENE

Develop Driver to Get Economical Transportation, Advises Expert

Staff Special
CHICAGO, Dec. 6

SELECTION of automotive equipment and the care of it in service were discussed in two addresses before the American Petroleum Institute in Chicago Dec. 8. The subject was approached from entirely different angles. The talk by J. F. Winchester, Standard Oil Co. of New Jersey, applied chiefly to equipment used in marketing while that of Roy F. Fike, Mid-Continent Petroleum Corp., had to do particularly with production.

Both speakers had many words of praise for the automobile manufacturers, their efforts to make good equipment and to fit it to needs of the user. Mr. Fike spoke of the 50 makes of machines now in common use as being the "survival of the fittest" out of 550 or more makes once offered to the trade. Mr. Fike said:

"The one universal need as I see it is the development of the man behind the wheel. No manufacturer of cars can survice who does not make a good motor. Every car needs two motors. A mechanical motor and a human motor, one developing horse power and the other developing horse sense. We all criticise the manufacturer when, if we looked behind the steering wheel instead of under the hood, we would find our greatest expense.

"We must expect in the production field, during the early stages at least, some waste as everybody must work under great handicaps. Getting the wells drilled in as soon as possible is the consideration that takes precedence over all else.

"However, the worst feature of the whole operation is the fact that these men on trucks or cars, working night and day, in the dust, mud and grease, become imbued with the rush and flush production methods and after things get back to normal, they are still operating their equipment without a thought of care, and this is where the greatest saving can be effected by us. This is applicable to all of the equipment used during the flush production period.

"THE Seminole development is one of the greatest of this generation, and if it were possible for you to look at the seething mass of humanity and equipment, three and four lines of traffic abreast, miles long, jamming against each other, moving an inch or a few feet at a time, with hardly a time that any two wheels are on the same level, with trailers attached to trucks, loads boomed tight, with long eight-wheel wagons with as high as 20 teams to a wagon, loaded with every pound they can budge and, besides, thousands of small cars mingled with this mass and taking hours to move a mile, you have just a small glimpse of the true picture. In these cases, if a truck, car, or team has an accident, which does happen every day, a winch line is attached to it and it is left on the side of the road. Klondike at its height was a mild show in comparison."

On the topic of developing men, Mr. Fike discussed the difficulty encountered in getting truck drivers to keep water in their radiators and the right amount of air in their tires. He stated that he agreed with the tire manufacturers in their contention that 90 per cent of tire failure is due to under inflation.

Mr. Fike told of the good results in truck operation obtained through the Petroleum Motor Transport Association of Tulsa, an organization of motor transport men in the oil business whose headquarters for the most part are local to Tulsa. It has been discussed thoroughly in previous issues of NATIONAL PETROLEUM NEWS.

First the motor transport men adopted an emblem to be used on their trucks. It is a radiator ornament and all trucks of all companies in the P. M. T. A. carry it. Through it a spirit of co-operation was built up among the men. Drivers carrying the same emblem began to be courteous to each other on the road; to give help to emblem bearing trucks found in trouble; to take pride in the appearance of their equipment, and to appreciate the advantages of mutual assistance.

OPPOSITION to any kind of rules or restrictions governing manufacture of motor trucks and trailers was voiced by Mr. Winchester. He maintained, in substance, that arbitrary rules and standards are of doubtful benefit when they are first made and often prove impediments in the path of progress and development of better machines.

"Tank wagons had been used for years before the advent of the motor truck. Prospective lower delivery costs resulted in a change to motor equipment for this purpose," Mr. Winchester said. "From the inception of the industry, well regulated companies have always considered it no small responsibility to deliver thousands of gallons of material in a given locality and it seems to me that this responsibility has been thoroughly met by the industry and practically no regulations of any sort are a real necessity."

Mr. Winchester's talk was illustrated. He used approximately 70 slides and did not say much about any one of them, but he took up the problems and points of discussion among truck and trailer manufacturers and operators, one by one, showing illustrative pictures on the screen.

Mr. Winchester frankly expressed personal preferences in some cases. But in every instance he told the advantages of the methods and mechanisms which he was not using.

HE FAVORS oval tanks and prefers welded construction. He recognizes double bulk heads and double sets of valves as safety measures of merit but does not think the points are of enough importance to have all the trucks in service sent to the shop and brought to standard. Finally he suggested three things that truck and tank and tank truck manufacturers might do to serve the oil industry.

First, have a series of standard wheel bases; second, series of standard frame widths; third, series of standard lengths behind the cab. This he pointed out would make the average oil man's equipment more elastic. Interchange of tanks and chassis and stake bodies could be effected with considerable economy. Finally with regard to the industry's work in the interest of safety, Mr. Winchester said:

"It appears to me that the oil industry has done very good safety work. The tabulated record presented last year at the convention of the National Fire Protection Association showed 61 fires between 1917 and 1925. The actual money value lost, as indicated, was approximately $600,000. During this time probably fifty billion gallons of petroleum products had been handled by tank wagons. Further figuration carries the record down to one fire for each 500,000 loads delivered."

Removing Chlorides from Crude Lessens Corrosion from Hydrogen Sulfide

By Brian Mead
Humble Oil & Refining Co.

Presented before American Petroleum Institute, Chicago, Sept. 6-8

CORROSION in refinery equipment has been the subject of numerous discussions in the literature in the past. Some of the most comprehensive work has been done by the Standard Oil Co. of Indiana and was published by R. E. Wilson and W. H. Bahlke[1].

In comparatively recent times, with the very rapid increase in the production of sour crude which it has become necessary for the petroleum technologists to use, the problem has become much more acute. At the present time it is quite safe to say that corrosion, consequent upon the running of such sour crudes, is receiving very widespread attention at the hands of petroleum technologists since they are finding that without such studies their refinery equipment is rapidly eaten up and their depreciation costs are enormously increased.

It has long been felt that the question of the sulfur content of a crude, from the viewpoint of corrosion, was by no means the whole story. Thus Morrell[2] and his co-workers have recently shown that it is possible to take two crudes, one of which has a very much higher sulfur content than the other, and yet to have comparatively little corrosion in running the crude of higher sulfur content, while that of lower content will eat out the equipment in a very short time unless adequate preventive measures are taken.

THERE is then, apparently some other factor which is entering into the corrosion situation with regard to these crudes. At the last annual meeting of the American Petroleum Institute it was clearly demonstrated that this other agency was the presence of smaller or larger quantities of salts of the alkaline earth metals, in particular of calcium and magnesium chlorides. Both these chlorides are comparatively readily hydrolyzed by moisture to give hydrochloric acid.

This, in conjunction with the hydrogen sulfide, which is either present in the crude originally as such or is formed by thermal decomposition of the sulfur compounds present in the crude, sets up an extremely corrosive condition which all refiners are finding it very difficult and expensive to deal with. It is in combating this combined effect of hydrochloric acid and hydrogen sulfide that anti-corrosive measures are largely concerned.

It will be desirable in studying this subject of corrosion to divide it into two parts: First, that dealing with corrosion which occurs during the storage of the crude prior to its being put through the refining operation; and secondly, corrosion occurring during the refining operation.

Points Brought Out in Study Of Corrosion Problems

Crude Storage

Some red lead primers have been found to stand up 11 months in tanks containing sour crude. Some lacquers, varnishes and enamels show promise. The time of test, however, is considered insufficient to justify definite recommendations.

Spraying on of a protective metal layer on tank roofs seems a promising means of allaying corrosion if paints prove unsatisfactory. Pretreatment of crude to remove free hydrogen sulfide usually will not justify cost.

Refining

Corrosion at atmospheric pressures and 700 to 750 degrees Fahr. is largely a function of the amount of magnesium and calcium chlorides as well as hydrogen sulfide.

Analysis is made of water and stream for hydrochloric acid, hydrogen sulfide and iron in suspension.

Maximum corrosion occurs in the last gasoline stills of the battery at temperatures of 450 degrees Fahr. and above. It then drops to a low point in the kerosene and gas oil cuts.

In paraffin crudes, magnesium and calcium chlorides can be removed by filtering at a temperature above the melting point of the wax, which also drives out all the moisture. The chlorides cannot be got rid of without getting rid of the wax.

None of these methods retards the formation of the hydrogen sulfide in the refining operation, but reduction of the amount of other acids makes the hydrogen sulfide nearly harmless.

Corrosion in cracking equipment is most dangerous. Analysis of coke formed in cracking for iron gives good indication of rate at which corrosion is proceeding.

Corrosion by Crude Before Refining

CRUDE storage tanks in which sour crudes are being handled are throughout the country, causing a great deal of trouble on account of the fact that the decks of the tanks are corroding very rapidly indeed. Not only is this expensive on account of the cost of replacing the decks which have corroded out but it also constitutes a very considerable hazard. This hazard exists on account of the formation of comparatively large quantities of iron sulfide on the roofs of tanks.

[1]Industrial and Engineering Chemistry 17, 355-8 (1925).

[2]Communicated at the Detroit meeting of the American Chemical Society, September 1927.

As is well known, this compound spontaneously oxidizes when exposed to the air and in so doing it generates sufficient heat to cause it to glow. This is the reason for the well known phenomenon of "sulfur glow," to which references are to be found in the literature and with which every petroleum technologist is becoming increasingly familiar.

In some cases, at the same time that the iron sulfide is formed there is also formed some amount of free sulfur and consequently, the glow has been wrongly attributed to oxidation of the sulfur itself rather than of the iron sulfide.

Crude storage tank corrosion appears to be due to a combination of three influences: 1—hydrogen sulfide which is in solution in the crude, and which, at ordinary prevailing temperatures, tends to come out of solution from the crude.

2—Water vapor either from water coming from the crude itself or from the atmosphere.

3—Oxygen from the air.

TO THIS may be added a fourth factor, namely, hydrocarbon vapors, which, although they may not actually influence the deterioration of the iron itself, yet may render inefficient any method of attempting to prevent this deterioration by the use of a protective coating since almost any kind of such coatings will be more or less affected by continued exposure to such hydrocarbon vapors.

So serious has the corrosion of crude storage become that it is necessary for both technologists and paint manufacturers to work hand in hand toward a satisfactory solution of this very pressing problem. In our experimental work on protective coatings in this company we have felt that since no one in either industry had any satisfactory proven way of preventing corrosion, it was necessary for us to take any and every kind of protective coating that seemed to offer even the smallest chance of success in our attempts to arrive at the solution of the problem.

Accordingly, paint samples were prepared using new tank steel and preparing the surface according to the best advice of the different paint manufacturers. These test panels were placed in crude storage tanks which were constantly being worked in order that the combined effects of all four variables which have been mentioned above might be observed over long periods of time.

In order that the samples might be at a temperature as nearly as possible equal to that of the deck of the tank, the panels were jammed between the supporting girders and the tanks themselves. At intervals of 30 days they were withdrawn for examination and were then replaced in the tank. As the result of tests extending over a period of 11 months a few protective coatings have been found which appear to offer considerable promise for use in this connection. These may be divided into two broad classifications. First ordinary paint: Of such coatings probably the most satisfactory which has been found is a red lead primer together with a top coat of any of the ordinary resistant paints. A paint of this type has given complete protection over the entire period of 11 months. The top coat went bad within 60 days but the primer is still entirely satisfactory and the metal surface is still in as good condition now as when it was put into service. This is difficult to explain, because hydrogen sulfide should attack any lead compound very readily. The fact remains, however, that it has given very satisfactory service under the test conditions stated, although we have as yet no information on its performance under actual service conditions. Second, a coating of the lacquer, varnish or enamel type. There are a number of such protective coatings on the market and several appear to offer considerable promise of success.

In giving these results it is to be understood clearly that as yet the period of test is considered to be insufficient for making any definite recommendation as to the type of paint to be employed and while these coatings have been specifically mentioned as having been found satisfactory in our test it is not known yet how they will stand up under more extended tests or under actual application to the roofs of the tanks.

Types of Protective Coating

In deciding what type of protective coating shall be employed in any given case, one of the primary considerations should be the ease with which the paint can be applied and also the degree of cleaning which it is necessary to give the tank before the application of the coating.

The use of the second broad classification of protective coatings would seem to be more desirable in cases where new roofs are being put in, since then it is possible to get an absolutely clean surface for the lacquer or varnish to bite on to and this will greatly increase the efficiency of the protection afforded.

It is apparently not necessary to give as intensive cleaning to a surface which is to be protected by a paint since in such cases there is normally present in the primer some chemical which will prevent the future deterioration of the surface itself.

In all cases, however, where the roofs of tanks which have been in service with sour crudes for some time before they are painted it seems to be highly desirable first of all to chip, beat and scrape off as much of the adherent scale as it is possible to remove by those means and then to finish up by sand blasting the entire surface which is to be painted. Only by this means can absolute assurance be obtained of complete removal of the products of past deterioration which, if they were not removed, would cause rupture of the protective coating from the under side.

During this cleaning operation the utmost care must be taken in handling any deposits of iron sulfide which are adherent to the iron work of the roof. As this iron sulfide dries up it is spontaneously inflammable and it is necessary to take precautions to assure that no trouble arises on this account. In addition to this the iron sulfide scale seems to have an irritant action on the skin, another feature which should be guarded against. All scale which is removed during the cleaning of such tanks should be carefully removed from the tank and spread out over the ground at some distance from any tank containing inflammable liquids.

SAMPLES of iron sulfide which had been buried in the ground for 6 months and were then unearthed and exposed to the air rapidly became so hot by the ensuing oxidation that they took fire.

In handling any of the lacquers, varnishes or enamels the manufacturer should be consulted as to the solvents which are used in their product to avoid the possibility of poisoning the painters who are at work on the surface. Adequate ventilation in the tanks being painted must always be provided.

It is frequently necessary to allow several days between coats and especially after the last coat, to ensure that the coat is thoroughly dried and set before crude is put into the tank. Failure to observe this precaution may easily ruin the efficiency of the coating.

There is another method of tackling the problem, consisting in the replacement of the steel roof with one of some metal or alloy which will satisfactorily resist the action of the corrosive agents concerned. Such a method as the spraying on of a protective metal layer, the metal so used being resistant to corrosion, would also seem to have application in this connection in the case that a satisfactory paint or varnish cannot be discovered to take care of the corrosion.

There is, of course, still another way of attacking the general problem of crude storage tank corrosion and this consists essentially in a pre-treatment of the crude to remove the corrosive agents. Usually, however, it is found to be inadvis-

able to attempt this on account of the emulsions which are liable to result when using caustic, for example, to remove the hydrogen sulfide in such crude.

The saving in crude storage tank corrosion consequent upon the reduction would probably not justify the very heavy treating cost which would be incurred by the use of such a process.

Moreover, such a treatment will be of little assistance in the actual refining operation since it will only remove the free hydrogen sulfide and this is a very small fraction of the potential hydrogen sulfide in the crude.

Corrosion in Refining Operations

The corrosion occurring in refining equipment may be considered under three heads.

(1) Atmospheric stills:

In stills operating at atmospheric pressure and at temperatures not exceeding 700-750 degrees Fahr., i.e., during the topping operations and when charging stock for cracking units is being made, the corrosion seems to be very largely a function of the amount of magnesium and calcium chlorides as well as of the hydrogen sulfide which is formed by thermal decomposition of compounds in the crude.

A comparatively large amount of data have been accumulated on several batteries when running Panhandle, Reagan and Crane-Upton crudes. To obtain a measure of the corrosion occurring in the battery when running any given crude it became necessary to develop a technique of analysis to meet the existing conditions.

This technique was changed several times during the course of the work as more and more information became available. The method latterly used consisted in taking the water and stream samples and analyzing them for acidity, both that as hydrogen sulfide and as hydrochloric acid and the amounts of the dissolved and suspended iron to be found in the streams and condensed water.

It has been feasible to draw up a theory of corrosion under these conditions which appears to meet the facts of the case. In the absence of any other acid, hydrogen sulfide attacks the iron of which the equipment is largely composed, forming iron sulfide. This iron sulfide is dense and coherent and, indeed, appears to form an actual protective coating on the surface of the iron.

In the presence of hydrochloric acid, formed by the hydrolysis of the alkaline earth metal chlorides which were originally present in the crude, however, this iron sulfide is dissolved to form ferrous chloride and hydrogen sulfide which latter is then free to attack more iron and the cycle is repeated. This ferrous chloride is actually found dissolved in the water which comes over with the stream as the result of using steam in the battery.

There are a number of ways in which this corrosion can be minimized or prevented and these will be briefly outlined:

1—Injection into the stills of some basic material to neutralize the hydrochloric acid as fast as this is formed. Caustic and soda both have their application in this connection and have been tried with satisfactory results.

In the following table the results of the use of caustic in the stills are given.

Charging Stock—Crane-Upton Crude

lbs. caustic per bbl of charge	Total HCl Overhead as lbs. per hour	Total Fe lbs. per hr.	Total H_2S in distillate lbs./hour
0	13.1	11.2	90.7
.025	0.9	0.3	101.

This table shows clearly that while the introduction of caustic has considerably cut down both the hydrochloric acid and the iron found in the streams, it has had no effect on the hydrogen sulfide evolution.

The maximum amount of corrosion occurs in the last gasoline stills in the battery, corresponding to temperatures of 450 degrees Fahr. and above. Thereafter it drops again to a very low value in the water white and gas oil cuts, although the hydrogen sulfide remains quite high for these cuts.

It seems from these and other similar data that once the effect of the hydrochloric acid is neutralized there is nothing to fear from the hydrogen sulfide as a corrosive agent under the conditions of operation of the stills. The use of caustic or other neutralizing agent in the stills rather than in the condenser worms seems to be desirable since in the latter case the streams are always much more dirty.

In some quarters it is considered advisable to treat the crude with caustic before charging to the battery. By giving a caustic pre-treat and allowing the emulsion so formed to go through all the heat exchange equipment available, it is possible to drop out some of the chlorides and also, by neutralization of organic acids occurring in the crude to form oil soluble sodium salts of these acids. These salts, because they dissolve in the crude oil, have very much better contact with the hydrochloric acid and react with it to form sodium chloride, which does not appreciably hydrolyze, and the free organic acids which cause little trouble from the corrosion point of view.

Use of a Neutralizing Agent

THE second way of minimizing corrosion is to use a neutralizing agent in the worm and overhead equipment to take care of this acid condition which is set up. Ammonia and caustic have been used in this connection with apparently successful results. This method, however, is not as satisfactory as the injection of the base into the stills themselves for the reason given above, although it is not subject to one disadvantage of the latter operation, that of hot bottoms which are always liable to occur when caustic is injected into a still. Lime, a valuable anti-corrosive measure in cracking coil operation, cannot satisfactorily be used here, since it is the hydrolysis of calcium (and magnesium) chloride which gives rise to the corrosive condition which it is desired to correct.

In topping operations where nothing heavier than gasoline is being taken off, it is sometimes feasible to run the stills dry. This very noticeably cuts down the rate of corrosion occurring in the battery on account of the fact that there is very little water with which the calcium and magnesium chlorides can react to give hydrochloric acid. In this connection, if any caustic is being used in the stills it should be as concentrated as possible, bearing in mind the difficulty of getting good contact between the caustic and the acid products at very high caustic concentrations.

If this is disregarded, a state of affairs will arise such that the added corrosion taking place on account of the water added with the caustic will be greater than the decrease in corrosion consequent upon the introduction of the caustic.

Such a result has actually been observed. This method of elimination of water will obviously not apply in cases where a deep cut is being made since in such cases it is necessary to have steam present in order to accomplish the distillation of the heavier products at a reasonably low temperature to avoid having excessive cracking. It would be possible to run without steam in the event that the residuum was to be cracked or that vacuum could be used to replace steam in bringing over the heavier fractions of the cracking stock.

Various methods have been tried from time to time for the elimination of the chlorides which have so large a share in causing the corrosion. In those paraffine crudes the inorganic salts which are present are very much harder to remove than would be the case in the absence of paraffine wax. Around each crystal of salt there appears to be a protective coating of wax and until this is removed there is little or no chance of getting at the salts to remove them

from the crude.

The most satisfactory way of achieving this seems to be by filtration of the crude at a slightly elevated temperature. It is claimed that such a process will almost completely remove the calcium and magnesium chlorides in the crude at a relatively low cost.

Such a process is available, and has the advantage of removing the last traces of water from the crude as well as the chlorides. It is important in using such a process to work at slightly elevated temperature in order that the wax may be melted, thus facilitating removal of the chlorides without unduly plugging the filter. The cost of treatment of the crude by this method should be not more than 1 or 2 cents per barrel, with probably less for large quantities of oil treated.

Neither this method nor any of the other methods which have been mentioned in previous paragraphs has the slightest effect on decreasing the amount of hydrogen sulfide evolved during the distilling operation. All that they do is to remove or neutralize the effect of other acids, thereby rendering the hydrogen sulfide comparatively innocuous as far as corrosion is concerned.

What has been written on crude storage tank corrosion concerning the danger of the spontaneous oxidation of iron sulfide is still true in handling these crudes in refinery operation and the utmost care must be exercised in opening up equipment in which sour crude has been running to avoid fires.

This can generally be achieved by the two-fold precaution of keeping the iron sulfide wet and of replacing the air by steam until such time as it is feasible to remove the iron sulfide from the equipment.

Rundown Tank Corrosion

THE problem of the corrosion of rundown tanks is even more serious and more difficult to handle satisfactorily than that of crude storage tank corrosion. It is attributed to the combined influence of hydrogen sulfide, moisture, oxygen from the air and hydrocarbon vapors although there is also a possibility that other sulfur compounds, either those originally present in the crude or else formed by thermal decomposition of these may be contributory causes to the corrosion which occurs.

So rapidly does iron sulfide form on inner surfaces or rundown tanks where sour distillates are being handled that it is necessary to clean them every six weeks to remove this hazard.

Protective coatings to take care of this condition are being tried at the present time but the tests have not been going a sufficient length of time to determine whether there is any really satisfactory protective coating on the market.

The hazardous condition outlined above can be somewhat aided by using a vapor tight system of tankage operating either under slight pressure or slight vacuum in conjunction with a gas recovery system.

By this means oxygen can be excluded from the tanks and so the danger of spontaneous oxidation is lessened. The iron sulfide, which is formed in rundown tanks, is bulky and loosely adherent in contradistinction to that which is formed in the stills at higher temperatures, where it is dense and very adherent in the absence of hydrochloric acid.

This means that corrosion proceeds very much further and more rapidly in rundown tanks than it does in the stills. Probably the only really satisfactory way of guarding against this type of corrosion is by elimination of the source, i.e., removing the hydrogen sulfide before the distillates reach the rundown tanks.

Cracking Equipment

WHILE corrosion in the equipment operating at atmospheric pressure is of great importance yet it would seem that that occurring in the cracking equipment is still more objectionable on account of the fact that due to the high pressure and temperatures involved, a comparatively small decrease in wall thickness of the equipment may set up a condition so hazardous that it is actually necessary to abandon the equipment.

Consequently very intensive work has been proceeding along the lines of cracking coil corrosion both with the view to determining its cause and also the most satisfactory method for its complete or partial elimination.

By periodical inspections and actual measurements with delicate instruments of the various parts of the equipment involved in the cracking operation it is possible to determine the rate at which any particular piece of refinery equipment is corroding out. However, while the corrosion is proceeding sufficiently rapidly to cause great concern, yet it may take a comparatively long time to determine just exactly where it is occurring most rapidly.

Consequently, it is necessary to evolve some means of quickly and accurately evaluating the corrosion occurring in any given cracking unit. It has been found, as the result of a large number of experiments, that if the products formed during the cracking operation are carefully analyzed for iron, it is possible to arrive at an estimate of the rapidity with which any given crude or other charging stock is corroding the equipment in a space of time which is only a fraction of that involved in the method using mechanical measurements. Furthermore, when we come to compare the results obtained by this method of estimating the corrosion loss with those which can be calculated from the results of the periodical inspections made, we find that there is a really remarkable agreement between them.

That is to say, they agree within 10 per cent, or thereabouts, which when we consider the number of operations involved in either method of computation, is very good. We find, as is shown in the accompanying table, that the iron loss largely shows up in the coke in the soaking drums, very little of it finding its way into the other products of the cracking reaction. The actual distribution of iron in the products is given as follows:

	Per Cent
Iron from the tubes	10.3
Iron in coke from soakers	85.5
Iron in coke from separators	3.3
Iron in water overhead	0.9
	100.0

These figures are characteristic of those obtained when charging gas oil to the cracking coils. It is seen that a large percentage of all the iron is to be found in the coke from the soaking drums. This is very fortunate, because it is a comparatively simple matter to measure the coke which is formed during the period of time that the soaker is in operation. By sampling each wheelbarrow load of coke withdrawn from the soaker, making a composite of all such samples, and then analyzing this composite for iron, one is able to arrive at a fairly accurate estimate of the actual amount of iron going out of the unit in the soaker.

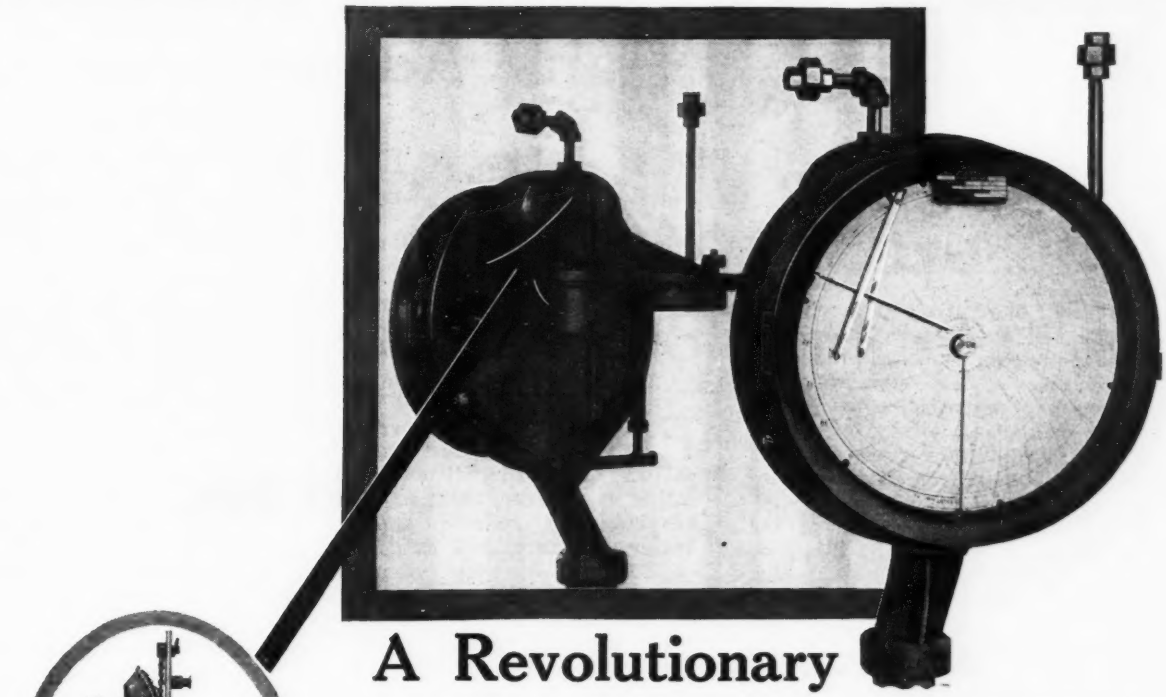
The method of analysis used consists essentially in the ashing down of the sample, using an ordinary combustion furnace for the purpose, dissolving the ash in acid, and then determining the iron gravimetrically.

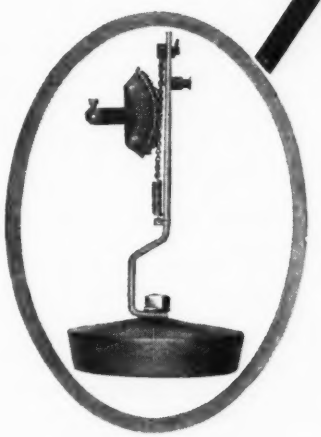
We find, amongst other things, that there is a very close relationship, in our charging stocks, between the amount of coke formed and the amount of corrosion being suffered by the unit.

CHICAGO, Dec. 9.—A reported deal whereby the Texas Co. will take over the bulk of the west Texas properties of the Pure Oil Co., lacked confirmation at Chicago, where leading executives of both corporations were attending the American Petroleum Institute.

It was said on good authority that an outright purchase was in prospect, but had not passed beyond the negotiations stage.

UNIFORM MULTIPLICATION





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THE COMPASS OF INDUSTRY

AN ORIFICE METER WITH NO INHERENT ERROR

Continuous Flash Vacuum Distillation Offers Many Advantages

By F. A. Howard and N. E. Loomis*

Presented before American Petroleum Institute, Chicago, Dec. 6-8

IN THE distillation of a typical crude oil by methods common in the petroleum industry practically three-fourths of the lubricating oil fractions are destroyed. A yield of 6-7 per cent of an oil having a viscosity of 285 at 100 degrees Fahr. is commonly obtained from Mid-Continent crude.

By the vacuum distillation of the same crude 24 per cent of the same viscosity oil is readily obtainable and the yield is only limited by the necessary flash point, since there are obtained fractions of such high viscosity that all of the available gas oil must be blended back to get the average viscosity desired.

While the above quantitative relation was first brought forcibly to our attention by experimental work started in the laboratories of the Standard Oil Co. (N. J.) approximately 9 years ago, the general qualitative advantages of vacuum in the distillation of petroleum products have been recognized for some decades.

More than 50 years ago a U. S. patent was issued to Tweddle in which an increase in yields of wax and lubricating oil by distilling a crude under vacuum was clearly indicated. Despite this knowledge vacuum distillation has been used to only a limited extent, particularly in this country, until the last few years. Abroad, it has received more attention.

THERE are many reasons for this limited use of vacuum distillation. Crude petroleum has been relatively cheap and there has been little incentive to make the maximum yield of lubricants from it. There is no present market for all of the lubricating oil that could be recovered.

In the case of wax-bearing crudes there has been general difficulty in the dewaxing of distillates produced under vacuum; this is particularly true when the distillates are not properly fractionated.

Vacuum equipment is more expensive in proportion to its size than that for atmospheric operation and requires better workmanship. It is well known that a small increase in vacuum at high vacua is as effective as a much larger increase at lower vacua. Only within recent years have manufacturers been able to furnish pumps, steam jets, etc., which will satisfactorily and cheaply maintain high vacua on large commercial equipment.

The use of vacuum serves only to reduce the pressure under which an oil is distilling, thereby lowering its boiling point, and preventing thermal decomposition. Given proper equipment practically all the advantages of vacuum distillation can be obtained by the use of steam in the still. To obtain the equivalent of a good vacuum, however, requires the use of large quantities of steam.

FOR an oil having a molecular weight of 400, such as a Mid-Continent distillate of about 25 degrees A.P.I., there is required 10 pounds of steam per gallon of distillate to be equivalent to 1 inch or 25 millimeters absolute pressure. Frequently, however, it is advantageous to use some steam and a moderately high vacuum, thereby getting the equivalent of a higher dry vacuum. The use of any steam, however, has the disadvantage of limiting the possible vacuum to the vapor pressure of water at the temperature to which it is cooled in the condensing equipment, unless a booster stage is interposed between the still and the condenser.

From what has just been said it is obvious that the use of vacuum may be considered either a substitute for or supplement of steam and it follows that vacuum will be most advantageous where the most steam is used in present operations.

The use of wet or dry vacuum in a distillation process may be aided by taking advantage of the lower mean boiling point characteristic of flash separation. In batch distillation or in distillation from a battery of continuous stills, the vaporization of the high boiling fractions is not aided by the presence of the low-boiling fractions and consequently the heavy fractions may be distilled only by raising the oil to the temperature at which the vapor pressure of these fractions equals the total pressure of the system.

In the presence of the low boiling fractions the heavy fractions are continuously removed at a lower temperature sufficient only to give a vapor pressure equal to their reduced partial pressure. This is secured when the oil is heated in a pipe still and the mixture of liquid and vapors discharged into a separator where flash distillation occurs under conditions approaching equilibrium.

SINCE vacuum distillation is used only where it is advantageous to maintain a low temperature of distillation and since flash separation always helps maintain such a low temperature it is surprising that vacuum flash distillation has not attracted more attention. Practically all vacuum equipment now operating is of the batch or continuous still type. This type permits of making cuts somewhat more advantageously than is possible where one must depend solely upon partial condensation with or without rectification.

Working with oils of relatively low boiling point it may be entirely feasible to carry out the distillation in more than one stage but to reduce a crude to a minimum residuum for

Successful Units Now Possible

FOR several years there has been much interest in the subject of distillation of lubricating oils under vacuum. The advantage of reduced pressure has been realized but until very recently nothing has come to light on any other method than batch distillation.

The speakers describe continuous vacuum distillation equipment which has been erected and operated at the Standard of New Jersey plant and which leads them to believe that is now possible to design equipment that will permit the recognized advantages of the pipe still to be combined with the benefits of distilling lubricating oils under reduced pressure.

*Standard Oil Co. of New Jersey.

any purpose whatsoever in which cracking is to be prevented, a one stage flash distillation is desirable after taking off from the crude only as much of the light fractions as will interfere with the maintenance of high vacuum.

Following the preliminary work already referred to for ascertaining the mathematical advantage of vacuum distillation, further work to establish the best construction for minimizing the back pressure on a still or separator, and following the operation of a small flash vacuum pipe still, we designed a commercial sized vacuum pipe still battery. This equipment was constructed and started operation as a test unit in January of 1924.

A brief description of what we believe was one of the earliest large scale vacuum pipe still installations may be of interest. Originally the equipment was intended to rerun pressed oil for production of pale and red oils, and since at least two overhead fractions were desired and since these are relatively low boiling distillates, the equipment was designed for two stage operation.

AFTER preliminary heating and partial reduction the feed stock was pumped through a pipe still at the rate of 3000 gallons an hour and delivered into a vertical 10 foot x 30 foot separator. From the bottom of this separator the residuum was drawn off to another pipe still in which the oil was further heated and delivered to a second separator. Unvaporized oil was drawn off from the bottom of the second separator.

Cooling coils were installed in the upper portion of each separator, the condensate from each group of coils refluxing into a pan from which it was pumped through cooling equipment. Provision was made for installation of bell-cap plates below the pan when and if required. Steam connections were provided so that steam could be introduced into either the coils or the bottoms of the two separators.

Large vapor lines connected the top of each separator to a common barometric condenser to which in turn was connected a vacuum pump.

Since installation this battery has been used for a large amount of experimental work, principally on West Columbian, Peruvian and Colombian crudes. It has been used for both one stage and two stage flash vacuum operation with both wet and dry vacuum, and for both overhead and residual products. Numerous difficulties have been encountered.

The method of introducing the oil from the pipe still into the separator so as to prevent or minimize entrainment is important. Sudden expansion sometimes results in a mist that it is very difficult to remove. Trouble was experienced with fogging

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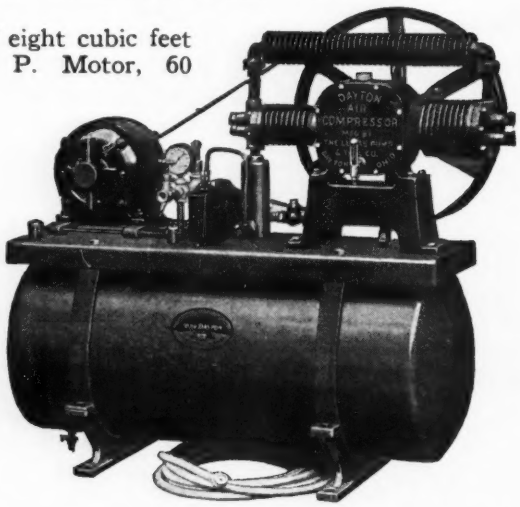

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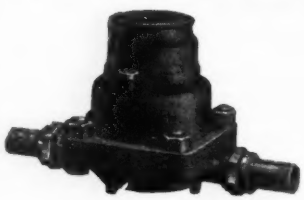

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around the cooling coils in the top of the separator, resulting in much oil being carried over to the barometric condenser, even when the temperature at the top of the separator was kept low. This was corrected by avoiding sudden or shock cooling, such as is obtained by having a large temperature differential between the vapors and cooling medium.

Considerable work has been done on the proper design of bell-caps to minimize the pressure drop when rectification is desired. Much work has been done on permissible vapor velocities through the tower. As a result of these studies we now believe it possible to design and efficiently operate such flash vacuum equipment.

Most of these advantages are shared by any other vacuum process and we have had some opportunity of comparing the results obtained by this pipe still installation with those of the ordinary vacuum shell still installation. To a great extent the advantages peculiar to vacuum pipe still equipment are those generally claimed for pipe stills operating at atmospheric pressure.

Of special importance, however, with such stocks as we would process in vacuum pipe stills, are the advantages of uniform heating by maintenance of high velocity over the heating surface, of reduced time during which the oil is subjected to heat, and particularly the advantage of lower temperature due to flash distillation.

Pipe still operation has made rapid progress in recent years. For the production of high viscosity distillates or heavy residues it is not only theoretically but practically advantageous to supplement pipe-still operation with vacuum separation of products.

N. P. A. Spring Meeting

CHICAGO, Dec. 8.—The regular semi-annual meeting of the National Petroleum Association is to be at Cambridge Springs, April 19 and 20, it was decided at a meeting of the trustees of the association held at the Stevens hotel Dec. 7.

The next meeting of trustees is to be at Pittsburgh Jan. 13, it was also decided. The day before this meeting the annual meeting of the Fire Marshals' Association, a branch of N.P.A. activity, is to be held, also in Pittsburgh. Plans will be discussed for including accident prevention work at refineries with the present fire prevention work carried on by the fire marshals.

T. J. Hillard, Waverly Oil Works, Pittsburgh, reported at the trustees' meeting on the progress in the study of refinery cost accounting methods being carried on by the association.

O. P. Keeney, Keeney Oil Co., New York, past president, presided in the absence of President E. M. Lyons, Tiona Refining Co., Clarendon, Pa.

Crude Stocks Touch New Peak Oct. 31; Gasoline Inventory Again Falls

By Roger B. Stafford
N. P. N. STAFF WRITER

CLEVELAND, Dec. 10

STOCKS of crude and refined oils at refineries, tank farms and in pipe lines Oct. 31 totaled 577,427,000 barrels, a gain of 4,048,000 barrels in October. This volume of oil was equivalent to 217.4 days' supply at the rate of demand in October. Sept. 30 stocks were equivalent to 206.2 days' supply at the rate of domestic and foreign demand in September. At the end of October, 1926, stocks were equal to only 203.9 days' supply at the rate of demand then current.

Stocks of all oils have increased each successive month for 13 months, rising 62,482,000 barrels from 514,945,000 barrels Sept. 30, 1926, and rising 61,805,000 barrels from 515,622,000 barrels Oct. 31, 1926. In the year ended Oct. 31, 1927, stocks of refined oils were reduced 1,926,000 barrels. As gasoline stocks have been lowered 3,974,000 barrels, stocks of heavier refined oils have increased 2,048,000 barrels in the year. Stocks of natural gasoline have increased 293,000 barrels and crude oils 63,458,000 barrels.

The great increase in crude oil stocks has been in light crudes east of California which have risen 75,126,000 barrels in a year. Stocks of heavy crudes have fallen 7,216,000 barrels in that time. In California stocks of refinable crudes have fallen 8,781,000 barrels and stocks of heavy fuel grade crude have risen 4,329,000 barrels. Stocks of crude oil have increased steadily for 11 months.

Excess of supply of petroleum in October over domestic and foreign demand averaged 131,000 barrels daily, compared with 38,000 barrels in September and 27,000 barrels in August. In October, 1926, new supply and demand balanced.

The Bureau of Mines' October report also revealed these facts:

1. Crude oil production declined 16,200 barrels daily average to 2,486,700 barrels daily average.

2. Above ground stocks of crude oil —458,824,000 barrels Oct. 31—were the largest in the history of the industry.

3. Gasoline production was again at a new height, totaling 28,903,000 barrels, a daily average of 932,000 barrels.

4. Draft of 188,000 barrels in refiners' stocks of gasoline.

5. Addition of 45,000 barrels to natural gasoline stocks.

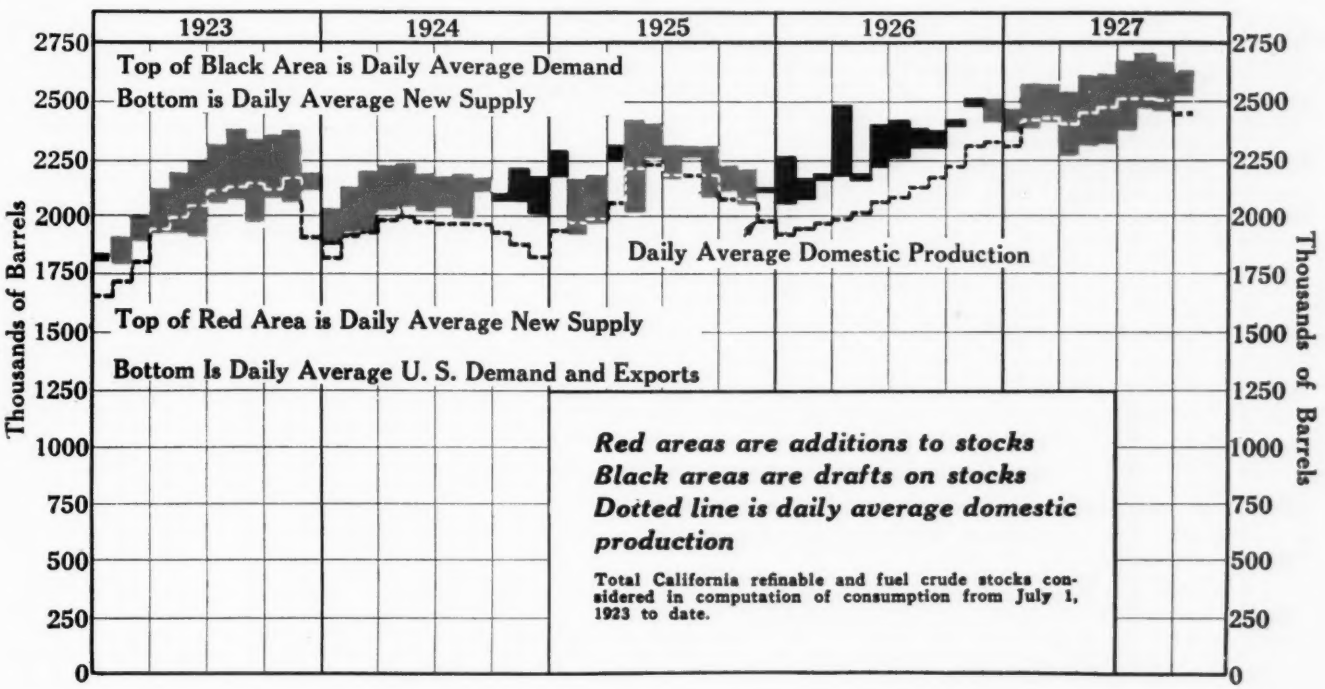
6. Increase in foreign and domestic demand for kerosene and decrease of 795,000 barrels in kerosene stocks.

7. Small decline in demand for lubricants causes increase of 137,000 barrels in stocks.

8. Increase of 195,000 pounds in wax stocks when domestic and export demand slumped.

9. Increase of 1,232,000 barrels in

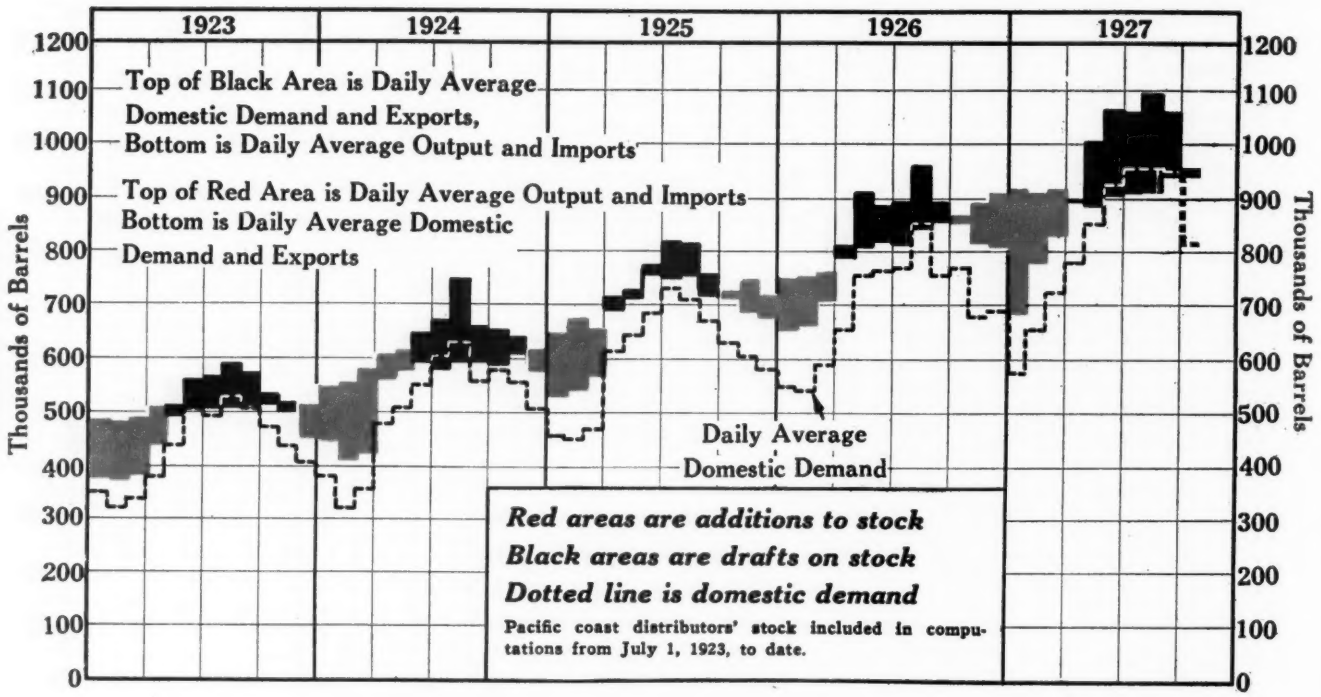
Crude Oil Production and Demand



October domestic production	2,486,500 Bbls.	daily av.
October imports	149,500 Bbls.	daily av.
Total new supply	2,636,000 Bbls.	daily av.
October indicated demand east of California	1,777,800 Bbls.	daily av.
October indicated California deliveries	676,200 Bbls.	daily av.
October exports	49,600 Bbls.	daily av.
Total indicated demand in October	2,503,600 Bbls.	daily av.

Stocks in pipe lines, and at tank farms east of California, Oct. 31, 1927	306,505,000 Bbls.
Stocks at refineries east of California	38,554,000 Bbls.
Stocks of foreign crude at refineries	298,000 Bbls.
California stocks 20° A. P. I. and lighter	21,609,000 Bbls.
California stocks heavier than 20° A. P. I.	91,858,000 Bbls.
Total stocks Oct. 31, 1927	458,824,000 Bbls.
Increase in stocks in October	8,102,000 Bbls.
Stocks Oct. 31, 1926	395,366,000 Bbls.

Gasoline Production and Consumption



October domestic output	932,000 Bbls. daily av.	October exports	128,000 Bbls. daily av.
October imports	12,000 Bbls. daily av.	Total indicated demand	950,000 Bbls. daily av.
Total new supply	944,000 Bbls. daily av.	Stocks Oct. 31, 1927	29,550,000 Bbls.
October domestic shipments	822,000 Bbls. daily av.	Decrease in stocks in October	188,000 Bbls.
		Stocks Oct. 31, 1926	33,712,000 Bbls.

stocks of gas and fuel oils east of California.

10. Charges to stills of crude oil and natural gasoline averaged more than in September but charges of unfinished oils averaged less.

Crude oil production was larger in October than in September in only Texas of the major producing states. Daily average in Texas rose 16,700 barrels to 609,700 because of development of west Texas fields. Panhandle production at 90,000 barrels average was 5,000 barrels below the September average. Production in Oklahoma fell 11,900 barrels daily average to 800,300 barrels average. Seminole net production, according to the bureau, averaged 426,000 barrels daily in October compared with 431,000 barrels daily in September.

California crude production fell 8,100 barrels average to 627,400 barrels average. Seal Beach production averaged 3,000 barrels a day less than in September but Long Beach production averaged 4,000 barrels more.

Production in states east of the Mississippi fell from 115,500 barrels daily average in September to 109,700 barrels daily average in September. The largest part of this decrease was in Illinois. Exact figures are not in the bureau's report but the volume of Pennsylvania grade crude produced averaged between 55,000 and 60,000 barrels of crude a day.

The increase of production in Texas brought up the average for the whole Mid-Continent field 1,700 barrels to 1,545,500 barrels.

In the first 10 months of this year Mid-Continent production totaled 451,982,000 barrels, or 108,586,000 barrels more than production in the first 10 months of 1926. Gulf Coastal production, totaling 41,871,000 barrels in the 10 months ended Oct. 31, was 7,058,000 barrels more than in the first 10 months of 1926. California production was 8,268,000 barrels more this year. Appalachian production was 1,748,000 barrels more this year than last. Rocky Mountain fields produced 7,110,000 barrels less crude in 10 months of this year than in 10 months of last year.

Production totaled 748,549,000 barrels in the 10 months, a gain of 118,191,000 barrels over production in the first 10 months of 1926, or a gain of 18.8 per cent this year. Production in the 10 months this year was almost as large as in all of last year and 1925, and more than production in 1923 and 1924 when overproduc-

Petroleum Supply and Demand — Barrels

	Oct. 1927	Sept. 1827	Aug. 1927	Oct. 1926
Domestic Crude production: Light	68,037,000	66,247,000	68,765,000	57,422,000
Heavy	9,044,000	8,834,000	9,233,000	12,242,000
Imports of crude oil	4,633,000	5,122,000	6,261,000	3,860,000
Imports of refined oil	1,041,000	868,000	774,000	1,765,000
Natural gasoline	3,419,000	3,245,000	3,214,000	2,907,000
Benzol	217,000	210,000	214,000	181,000
Total new supply all oils	86,391,000	84,526,000	88,461,000	78,377,000
Total stocks end of preceding month	573,379,000	572,245,000	571,418,000	518,621,000
Total supply of all oils	659,770,000	656,771,000	659,879,000	596,998,000
Exports of crude oil	1,539,000	1,297,000	1,382,000	1,110,000
Exports of refined oil	11,458,000	9,649,000	11,743,000	7,630,000
Domestic demand, crude and refined	69,346,000	72,446,000	74,509,000	69,346,000
Total demand	82,343,000	83,392,000	87,634,000	78,372,000
Total stocks of all oils end of month	577,427,000	573,379,000	572,245,000	515,622,000
Days' supply	217.4	206.2	202.4	203.9
Increase in stocks	4,048,000	1,134,000	827,000	677,000
Daily average new supply	2,787,000	2,818,000	2,854,000	2,528,000
Daily average demand	2,656,000	2,780,000	2,827,000	2,528,000
Daily average excess of supply	131,000	38,000	27,000	.....
Crude stocks:				
East of California: Light	297,263,000	291,581,000	287,465,000	222,137,000
Heavy	48,094,000	48,160,000	46,208,000	55,210,000
In California: Light	21,609,000	22,795,000	23,262,000	30,390,000
Heavy	91,858,000	92,186,000	91,965,000	87,529,000
Total stocks of crude	458,824,000	454,722,000	448,900,000	395,366,000
Total stocks of refined	117,822,000	117,921,000	122,499,000	119,768,000
Stocks of natural gasoline	781,000	736,000	846,000	488,000

tion became serious.

There was an increase of only 341,000 barrels in crude oil stocks at refineries. Tank farm and pipe line stocks of crude increased 6,407,000 barrels in the Mid-Continent alone. The increase in the whole country was 8,102,000 barrels.

Stocks of foreign crude were increased 62,000 barrels although daily average imports of crude fell from 170,700 barrels in September to 149,500 in October. Sources of the October imports and daily average imports were: Mexico, 48,500 barrels; Venezuela, 72,900 barrels; Colombia, 25,700 barrels, and other countries 2,400 barrels. In September the imports were: Mexico, 74,400 barrels; Venezuela, 58,600 barrels; Colombia, 25,500 barrels, and other countries 12,200 barrels.

Exports of crude averaged 49,600 barrels a day compared with 43,200 a day in September. As usual the largest part of the exported crude went to Canada.

Imports of crude in the first 10 months of this year totaled 46,608,000 barrels, compared with 50,352,000 barrels in the first 10 months of 1926. Exports totaled 10,626,000 barrels in 10 months this year and 10,732,000 in 10 months last year.

Average output of gasoline was 0.92 per cent more in October than in September, but average shipments were 10.44 per cent less. Shipments of gasoline were larger in only the Appalachian district, but stocks were lowered in the East Coast, Indiana-Illinois, Louisiana-Arkansas and Rocky Mountain districts.

Compared with stocks Oct. 31, 1926,

(*Continued on Page* 93)

Crude Oil Stocks—By Months

(Thousands of Barrels)

1926	East of Calif.	†In Calif.	Total U. S.
January	291,400	130,841	422,241
February	287,975	131,638	419,613
March	287,710	131,678	419,388
April	286,208	124,290	410,498
May	284,009	125,359	409,368
June	281,432	122,794	404,538
July	278,184	121,344	399,528
August	277,486	119,893	397,379
September	277,771	117,964	395,735
October	277,014	117,928	394,942
November	277,099	117,497	394,596
December	278,077	118,131	396,208
1927			
January	278,972	118,988	397,673
February	285,458	117,410	402,868
March	290,110	117,454	407,564
April	297,895	117,843	415,738
May	307,016	117,432	424,448
June	315,702	117,414	433,116
July	324,930	116,996	441,926
August	333,673	115,227	448,900
September	339,741	114,981	454,722
October	345,357	113,467	458,824

†Includes heavy fuels.

Crude Production — Barrels

(Daily Averages)

States	October 1927	September 1927	October 1926
Arkansas	102,100	103,700	148,000
California	627,400	635,500	611,800
Colorado	7,000	6,900	7,400
Illinois	17,900	20,800	21,000
Indiana	2,400	2,500	2,100
Kansas	106,900	107,700	115,400
Kentucky	19,000	19,600	17,400
Louisiana	56,300	58,700	59,600
Michigan	1,200	1,200	400
Montana	13,000	13,800	18,500
New Mexico	2,100	2,400	4,500
New York	6,100	6,400	5,700
Ohio	20,100	21,000	19,600
Oklahoma	800,300	812,200	511,200
Pennsylvania	26,700	27,100	25,800
Tennessee	200	200	100
Texas	609,700	593,000	574,900
West Virginia	16,100	16,700	16,800
Wyoming	52,000	53,300	61,900
Total U. S.	2,486,500	2,502,700	2,222,100

Stocks of Crude Oil

DOMESTIC UNLESS OTHERWISE SPECIFIED. AMOUNTS IN THOUSANDS OF BARRELS

At Refineries

Districts	Oct. 1927	Sept. 1927	Oct. 1926
East Coast:			
Domestic	8,772	9,062	9,271
Foreign	2,675	2,986	2,220
Appalachian	1,740	1,768	1,675
Indiana, Illinois, etc.	2,737	2,727	2,034
Oklahoma, Kans., etc.	4,850	4,536	2,287
Texas: Inland	1,677	1,621	863
Texas Gulf Coast:			
Domestic	7,473	7,295	7,536
Foreign	174	204	281
Ark. and inland La.	402	355	710
Louisiana Gulf Coast:			
Domestic	5,643	5,130	7,519
Foreign	1,043	1,083	766
Rocky Mountain	1,368	1,446	1,487
U. S. east of Calif.	38,554	38,213	36,649

AT TANK FARMS, IN PIPE LINES AND ELSEWHERE THAN REFINERES

Districts	Oct. 1927	Sept. 1927	Oct. 1926
Appalachian	6,552	6,728	6,666
Kentucky	1,081	1,139	1,163
Lima-Indiana	1,077	1,007	702
Ill., S. W. Indiana	12,100	12,113	11,677
Okla., Kans., Tex., except Coastal	214,707	208,300	137,142
N. La.-Ark.	25,628	26,640	33,840
Gulf Coast	17,679	17,766	19,415
Rocky Mountain	27,681	27,599	29,297
East of Calif. pipe line, tank farm stocks	306,505	301,292	239,902
Foreign Crude:			
Atlantic Ports	100	53	73
Gulf Ports	198	183	536
Total refinery, pipe line, and tank farm stocks, east of Calif.	345,357	339,741	277,160
California:			
20° and lighter	21,609	22,795	30,467
Heavier than 20°	91,858	92,186	87,461
Grand Total	458,824	454,722	395,088

CLASSIFICATION BY GRAVITY

(Elsewhere than refineries east of California)

24° and lighter	297,263	291,581	222,957
Heavier than 24°	48,094	48,160	54,203

Crude Oil Production by Fields — Barrels

Fields	October Daily Avg. 1927	September Daily Avg. 1927	October Daily Avg. 1926	Total Jan.-Oct. 1927	Total Jan.-Oct. 1926
Appalachian	83,500	86,200	80,400	25,492,000	23,744,000
Lima-Indiana	5,000	5,100	5,400	1,573,000	1,728,000
Michigan	1,200	1,200	400	369,000	48,000
Ill.-S. W. Indiana	20,000	23,000	22,700	6,531,000	7,056,000
Mid-Continent	1,545,500	1,543,800	1,254,700	451,982,000	343,396,000
Gulf Coast	129,800	131,500	154,400	41,871,000	34,813,000
Rocky Mountain	74,100	76,400	92,300	25,434,000	32,544,000
California	627,400	635,500	611,800	193,297,000	185,029,000
U. S. Total	2,486,500	2,502,700	2,222,100	746,549,000	628,358,000

Gasoline Situation by Districts — Barrels

Districts	October Daily Avg. Output	September Daily Avg. Output	October Change %	October Daily Avg. Shipments	September Daily Avg. Shipments	October Change %	Stocks October 31, 1927	Stocks Sept. 30, 1927	Stocks Oct. 31, 1926	Districts
East Coast	138,451	129,467	+ 6.93	140,322	156,667	—10.43	4,490,000	4,548,000	6,333,000	East Coast
Appalachian	35,806	35,500	+ 0.86	35,065	34,433	+ 1.84	847,000	824,000	716,000	Appalachian
Ind., Ill., etc.	123,226	118,967	+ 3.58	134,355	138,167	— 2.76	3,225,000	3,570,000	3,486,000	Ind., Ill., etc.
Okla., Kans., etc.	159,258	167,867	— 5.13	142,935	195,233	—26.79	2,337,000	1,831,000	2,628,000	Okla., Kans., etc.
Texas	195,613	195,933	— 0.16	194,806	207,033	— 5.91	4,009,000	3,984,000	4,027,000	Texas
Louisiana and Ark.	71,000	69,700	+ 1.86	77,000	81,167	— 5.13	1,433,000	1,619,000	3,070,000	Louisiana and Ark.
Rocky Mountain	35,613	30,233	+17.79	53,774	63,867	—15.80	1,408,000	1,971,000	3,450,000	Rocky Mountain
California	173,387	176,200	— 1.60	160,161	174,867	— 8.41	11,801,000	11,391,000	9,996,000	California
U. S. Total	932,354	923,867	+ 0.92	938,418	1,047,766	—10.44	29,550,000	29,738,000	33,706,000	U. S. Total
Texas Gulf Coast	154,484	154,833	— 0.23	153,742	167,933	— 8.45	3,358,000	3,335,000	3,710,000	Texas Gulf Coast
La. Gulf Coast	56,129	54,600	+ 2.80	63,193	62,400	+ 1.27	1,299,000	1,518,000	3,007,000	La. Gulf Coast

Kerosene Situation by Districts — Barrels

Districts	October Daily Avg. Output	September Daily Avg. Output	October Change %	October Daily Avg. Shipments	September Daily Avg. Shipments	October Change %	Stocks October 31, 1927	Stocks Sept. 30, 1927	Stocks Oct. 31, 1926	Districts
East Coast	29,516	32,800	—10.01	43,677	29,867	+46.24	1,399,000	1,838,000	1,774,000	East Coast
Appalachian	10,387	10,067	+ 3.18	10,742	10,633	+ 1.03	298,000	309,000	276,000	Appalachian
Ind., Ill., etc.	14,290	14,500	— 1.45	12,774	16,600	—23.05	857,000	810,000	712,000	Ind., Ill., etc.
Okla., Kans., etc.	26,968	26,267	+ 2.67	32,645	25,700	+27.02	457,000	633,000	472,000	Okla., Kans., etc.
Texas	42,871	40,867	+ 4.90	46,710	39,567	+18.05	1,461,000	1,580,000	1,913,000	Texas
Louisiana and Ark.	14,452	15,233	— 5.13	18,000	24,567	—26.73	861,000	971,000	1,417,000	Louisiana and Ark.
Rocky Mountain	5,193	4,167	+24.62	4,226	6,467	—34.65	177,000	147,000	241,000	Rocky Mountain
California	13,871	12,300	+12.77	14,419	11,233	+27.47	1,815,000	1,832,000	1,433,000	California
U. S. Total	157,548	156,200	+ 0.86	183,193	164,633	+11.27	7,325,000	8,120,000	8,238,000	U. S. Total
Texas Gulf Coast	35,516	34,500	+ 2.94	38,677	29,267	+32.15	1,338,000	1,436,000	1,446,000	Texas Gulf Coast
La. Gulf Coast	12,903	13,433	— 3.95	16,097	22,467	—28.35	848,000	947,000	1,403,000	La. Gulf Coast

Natural Gasoline and Motor Blends — Barrels

Districts	Daily Avg. Production Oct. (net)	Daily Avg. Production Sept. (net)	Stocks End of October	Stocks End of September	Motor Fuel Blends Made in Oct.	Motor Fuel Blends Made in Sept.	Stocks of Blends End of Oct.	Stocks of Blends End of Sept.	Districts
Appalachian	5,683	4,444	66,976	57,952	9,500	9,547	6,119	5,762	Appalachian
Ind., Ill., etc.	1,074	952	6,571	6,095	809	786	357	357	Ind., Ill., etc.
Okla., Kans. etc.	40,706	40,079	408,857	395,000	114,952	123,904	14,667	15,048	Okla., Kans. etc.
Texas	21,198	20,873	228,929	206,762	27,286	18,024	3,286	3,238	Texas
Louisiana & Ark.	5,298	5,079	24,071	22,976	11,024	10,571	500	333	Louisiana & Ark.
Rocky Mountain	2,918	3,095	13,690	15,095	2,690	2,691	2,643	2,762	Rocky Mountain
Total east of Calif.	76,881	74,524	740,095	703,881	166,261	165,524	27,572	27,500	Total east of Calif.
California	33,410	33,651	31,786	31,810	.....	.....	214	23	California
U. S. Total	110,291	108,175	780,881	735,691	.....	.....	27,786	27,524	U. S. Total

Lubricants Situation by Districts — Barrels

Districts	October Daily Avg. Output	September Daily Avg. Output	October Change %	October Daily Avg. Shipments	September Daily Avg. Shipments	October Change %	Stocks October 31, 1927	Stocks Sept. 30, 1927	Stocks Oct. 31, 1926	Districts
East Coast	30,484	32,833	— 7.15	27,452	31,767	—13.58	2,688,000	2,594,000	2,660,000	East Coast
Appalachian	13,484	12,733	+ 5.90	11,968	11,867	+ .85	1,033,000	986,000	995,000	Appalachian
Ind., Ill., etc.	9,355	8,967	+ 4.33	8,387	8,600	— 2.54	705,000	675,000	658,000	Ind., Ill., etc.
Okla., Kans., etc.	6,354	6,367	— 0.20	5,161	6,867	—24.84	422,000	385,000	389,000	Okla., Kans., etc.
Texas	20,516	20,400	+ 0.57	22,096	23,600	— 6.37	1,692,000	1,741,000	1,636,000	Texas
Louisiana and Ark.	1,161	3,300	—64.82	839	3,900	—78.49	99,000	89,000	107,000	Louisiana and Ark.
Rocky Mountain	1,613	1,500	+ 7.53	1,484	1,533	— 3.20	107,000	103,000	161,000	Rocky Mountain
California	5,968	6,633	—10.03	7,129	6,067	+17.50	838,000	874,000	831,000	California
U. S. Total	88,935	92,733	— 4.10	84,516	94,200	—10.28	7,584,000	7,447,000	7,437,000	U. S. Total
Texas Gulf Coast	19,452	19,367	+ 0.44	21,387	22,233	— 3.81	1,639,000	1,699,000	1,603,000	Texas Gulf Coast
La. Gulf Coast	1,161	3,300	—64.82	871	3,900	—77.67	98,000	89,000	105,000	La. Gulf Coast

Gas and Fuel Oil Situation by Districts — Barrels

Districts	October Daily Avg. Output	September Daily Avg. Output	October Change %	October Daily Avg. Shipments	September Daily Avg. Shipments	October Change %	Stocks October 31, 1927	Stocks Sept. 30, 1927	Stocks Oct. 31, 1926	Districts
East Coast	221,871	200,433	+10.70	223,968	175,700	+27.47	10,566,000	10,631,000	5,831,000	East Coast
Appalachian	22,581	20,467	+10.33	17,097	18,400	— 7.08	1,110,000	940,000	692,000	Appalachian
Ind., Ill., etc.	62,129	61,000	+ 1.85	56,935	59,533	+ 4.36	2,057,000	1,896,000	1,391,000	Ind., Ill., etc.
Okla., Kans., etc.	93,677	102,300	— 8.43	82,968	92,667	—10.46	6,122,000	5,790,000	5,583,000	Okla., Kans., etc.
Texas	206,258	178,733	+15.40	178,903	177,100	+ 1.02	9,397,000	8,549,000	8,674,000	Texas
Louisiana and Ark.	80,355	87,267	— 7.92	75,290	85,267	—11.70	3,308,000	3,151,000	2,743,000	Louisiana and Ark.
Rocky Mountain	20,161	19,300	+ 4.46	21,548	18,000	+19.71	631,000	674,000	1,462,000	Rocky Mountain
California	391,193	408,467	— 4.23	.....	.....	.....	.....	.....	.....	California
U. S. Total	1,098,225	1,077,967	+ 1.88	1,047,902	1,035,133	+ 1.23	33,191,000	31,631,000	26,376,000	U. S. Total
Texas Gulf Coast	160,581	135,367	+18.63	135,710	130,600	+ 3.91	7,767,000	6,996,000	7,736,000	Texas Gulf Coast
La. Gulf Coast	46,516	50,367	— 7.64	41,032	47,367	—13.37	2,758,000	2,588,000	1,956,000	La. Gulf Coast

Coke, Asphalt, Miscellaneous Products

	Coke Output (Tons)	Coke Stocks (Tons)	Asphalt Output (Tons)	Asphalt Stocks (Tons)	Miscel. Products Output (Bbls.)	Miscel. Products Stocks (Bbls.)	Unfin. Oil Output (Bbls.)	Unfin. Oil Stocks (Bbls.)	Losses (Bbls.)	
January, 1926	73,701	230,566	162,383	174,564	491,652	1,063,619	2,097,000	37,880,000	1,995,000	January, 1926
February	64,105	210,247	152,468	182,063	481,428	1,073,238	2,340,500	28,808,000	1,767,000	February
March	80,689	219,820	210,596	195,052	597,810	1,217,119	2,195,928	39,098,000	2,059,000	March
April	76,031	216,163	198,598	239,953	572,381	1,138,095	2,481,952	38,785,000	1,982,000	April
May	79,982	234,025	248,390	229,819	779,310	1,210,428	2,756,024	38,681,000	2,270,000	May
June	81,326	246,707	300,970	200,881	784,476	1,010,381	2,767,000	40,081,000	2,308,000	June
July	83,358	260,727	281,196	184,853	800,310	897,452	2,927,214	38,527,000	2,419,000	July
August	89,100	277,668	305,944	200,175	733,000	858,000	2,848,000	39,822,000	2,605,000	August
September	95,111	287,546	308,572	188,512	749,000	835,000	2,721,000	39,500,000	2,492,000	September
October	87,946	287,354	323,348	187,845	738,000	863,000	2,790,000	40,006,000	2,437,000	October
November	91,459	285,905	215,973	166,788	661,000	1,030,000	2,455,000	38,770,000	2,267,000	November
December	92,500	290,582	213,697	193,331	644,000	1,100,000	2,399,000	38,829,000	2,288,000	December
1926, Total	995,308	.....	2,922,788	.....	8,030,000	.....	31,240,000	.....	26,928,000	1926, Total
January, 1927	92,914	287,394	191,180	215,337	511,000	1,189,000	2,473,000	39,287,000	2,367,000	January, 1927
February	88,102	294,682	172,685	234,450	546,000	1,282,000	2,729,000	38,986,000	2,091,000	February
March	98,163	325,521	222,309	235,251	525,000	1,356,000	2,412,000	39,392,000	2,369,000	March
April	88,404	318,529	273,767	219,502	561,000	1,410,000	1,978,000	38,095,000	2,237,000	April
May	87,900	329,400	319,000	222,500	599,000	1,368,000	1,809,000	37,760,000	2,599,000	May
June	95,300	293,100	347,100	232,400	677,000	1,180,000	2,283,000	38,192,000	2,487,000	June
July	90,400	305,800	334,700	214,100	747,000	928,000	2,490,000	39,647,000	2,516,000	July
August	94,800	303,600	339,500	192,200	743,000	879,000	1,955,000	38,711,000	2,598,000	August
September	97,500	313,500	333,100	176,300	634,000	863,000	1,811,000	36,962,000	2,453,000	September
October	101,600	331,300	332,600	189,400	663,000	960,000	1,977,000	35,874,000	2,405,000	October

Daily Average Runs to Stills—All Oils—Barrels

	East Coast	Appala.	Ind.-Ill.	Okla.-Kans.	Texas	La.-Ark.	Rocky Mt.	Calif.	Total U. S.	
January, 1926	334,742	73,516	185,709	261,903	426,129	196,484	87,548	558,097	2,120,900	January, 1926
February	360,036	78,428	192,964	256,857	434,674	200,357	96,250	549,821	2,169,400	February
March	369,032	74,677	187,419	250,742	422,774	203,839	98,355	563,228	2,176,500	March
April	365,400	77,133	203.033	266,000	451,667	205,867	98,733	557,900	2,225,200	April
May	373,516	81,677	211,065	293,903	431,451	199,161	101,322	588,613	2,280,700	May
June	382,800	85,433	211,467	293,267	446,867	207,433	107,033	574,033	2,308,300	June
July	418.742	83,097	210,193	292,645	448,516	206,839	102,355	575,193	2,337,600	July
August	395,935	87,613	208,677	300,484	446,484	211.129	106,903	599,645	2,356,900	August
September	404,600	86,667	212,300	300,167	452,900	213,000	109,333	607,867	2,386,833	September
October	427,935	87,645	208,710	279,645	482,935	210,612	113,323	587,645	2,398,500	October
November	462,200	86,567	214,600	288,800	480,466	209,033	108,566	585,633	2,435,866	November
December	442,968	84,838	209,355	284,516	516,354	226,903	102,613	589,322	2,456,870	December
January, 1927	408,355	82,581	206,226	278,258	517,160	228,516	103,161	616,516	2,440,774	January, 1927
February	412,714	86,928	197,785	295,964	504,642	228,107	103,321	633,108	2,462,571	February
March	439,387	83,097	209,161	283,548	479,806	224,903	103,290	597,839	2,421,032	March
April	411,367	84,400	204,067	286,067	491,567	224,400	100,500	615,333	2,417,701	April
May	413,516	82,000	226,677	293,581	494,806	212,129	75,839	618,452	2,417,000	May
June	429,967	85,400	238,067	301,733	490,633	199,933	87,300	605,733	2,438,766	June
July	439,871	80,935	250,387	317,129	482,839	199,194	87,226	633,032	2,490,613	July
August	465,839	86,065	237,194	319,516	481,032	202,226	76,032	618,516	2,486,420	August
September	453,000	87,100	225,667	327,300	483,900	211,600	71,700	637,467	2,497,733	September
October	475,580	91,161	229,677	307,774	513,419	204,968	80,871	617,937	2,521,387	October

(*Continued from Page* 89)

stocks at the end of last October were smaller in all but the Appalachian and California districts. In the year gasoline inventories were reduced more than 50 per cent by the Rocky Mountain and Louisiana-Kansas refineries. Stocks in the whole country were 4,162,000 barrels or 12.34 per cent less Oct. 31, 1927, than on Oct. 31, 1926.

Stocks of gasoline in California Oct. 31 constituted 40 per cent of the total stocks of the United States, being 11,801,000 of the total 29,550,000 barrels held by refiners.

Producion of gasoline in the first 10 months of 1927 totaled 273,597,000 barrels, a gain of 27,606,000 barrels or 11.22 per cent over output in the first 10 months of 1926. Imports in the 10 months this year have been 328,000 barrels or 7.08 per cent less than in the same months last year.

Domestic demand has totaled 249,810,000 barrels this year, a gain of 13.7 per cent over the 219,720,000 barrels domestic demand in the first 10 months of 1926. Exports of gasoline totaled 37,564,000 barrels this year compared with 36,066,000 last year, a gain of 4.15 per cent.

During October 984,000 barrels of California gasoline was shipped through the Panama canal to Gulf and Atlantic ports of the United States, compared with 1,046,000 barrels in September. In the first 10 months of this year movement from California to eastern U. S. ports has totaled 9,801,000 barrels, compared with 6,818,000 barrels in the like period last year.

Gasoline production in October was the largest in the history of the industry both in total volume and in daily average. Charges of all oils to stills was also larger than in any previous month, being 2,521,400 barrels daily average, compared with 2,497,733 barrels, the previous record which was made in September. Fifty-nine per cent of the October output was straightrun gasoline, 31 per cent produced by cracking, and 10 per cent was natural gasoline. In September the percentages were 60, 30 and 10, respectively.

Charges of all oils were increased in every region except California and the Mid-Continent. The largest increase was in the Texas Gulf Coast region. The increase for all of Texas was approximately 30,000 barrels daily average. East Coast plants increased their runs more than 22,000 barrels daily average. Oklahoma and Kansas refineries decreased their runs almost 20,000 barrels daily average.

Output of natural gasoline averaged 110,291 barrels a day in October, an increase of 2,116 barrels over September average output. The increase of 45,000 barrels in stocks of natural gasoline was divided among the Appalachian and Mid-Continent regions. There was only trivial change in output of blended motor fuels in October, compared with September, and stocks were steady.

Kerosene production was increased 1,348 barrels daily average or 0.86 per cent. Shipments averaged 18,560 barrels more in October than in September or 11.27 per cent. Stocks were increased in only the Indiana-Illinois and Rocky Mountain districts in October but were lower than a year before in the East Coast, Oklahoma-Kansas, Louisiana-Arkansas and Rocky Mountain districts.

Average output of lubricating oils fell from 92,700 barrels in September

Kerosene, Lubes, Wax, Fuel and Gas Oils

	Production	Imports	Exports	Domestic Shipments	Stocks End of Month
KEROSENE (Bbls.)					
January, 1926	5,122,000	.....	1,871,000	3,521,000	6,851,000
February	4,746,000	1,000	1,577,000	3,166,000	6,855,000
March	5,516,000	1,000	1,876,000	3,492,000	7,004,000
April	5,037,000	1,000	1,760,000	3,268,000	7,014,000
May	5,210,000	4,000	1,623,000	3,227,000	7,378,000
June	5,009,000	3,000	1,601,000	2,908,000	7,881,000
July	4,877,000	21,000	1,612,000	2,733,000	8,434,000
August	5,162,000	20,000	2,689,000	2,731,000	8,196,000
September	5,207,000	21,000	1,843,000	3,419,000	8,162,000
October	5,126,000	3,000	1,818,000	3,235,000	8,238,000
November	5,357,000	.....	1,943,000	3,592,000	8,060,000
December	5,399,000	.....	1,847,000	3,037,000	8,575,000
1926 Total	61,768,000	75,000	22,060,000	38,329,000	.....
January, 1927	5,113,000	.....	1,616,000	3,882,000	8,190,000
February	4,453,000	1,000	1,399,000	2,590,000	8,655,000
March	4,802,000	3,000	1,351,000	3,356,000	8,753,000
April	4,608,000	1,000	1,861,000	2,776,000	8,725,000
May	4,663,000	1,000	1,633,000	3,188,000	8,568,000
June	4,308,000	2,000	1,616,000	2,695,000	8,567,000
July	4,484,000	.....	1,376,000	2,637,000	9,038,000
August	4,420,000	4,000	1,700,000	3,389,000	8,373,000
September	4,686,000	.....	1,659,000	3,280,000	8,120,000
October	4,884,000	1,000	2,211,000	3,469,000	7,325,000
LUBRICANTS (Bbls.)					
January, 1926	2,648,000	2,000	727,000	1,632,000	7,544,000
February	2,448,000	1,000	789,000	1,294,000	7,910,000
March	2,646,000	4,000	740,000	2,180,000	7,640,000
April	2,692,000	3,000	928,000	2,039,000	7,368,000
May	2,863,000	11,000	717,000	1,869,000	7,656,000
June	2,681,000	3,000	984,000	2,042,000	7,314,000
July	2,831,000	1,000	747,000	2,071,000	7,328,000
August	2,648,000	2,000	660,000	2,092,000	7,226,000
September	2,645,000	2,000	705,000	2,019,000	7,149,000
October	2,768,000	2,000	704,000	1,778,000	7,437,000
November	2,724,000	1,000	820,000	1,722,000	7,620,000
December	2,699,000	1,000	917,000	1,827,000	7,576,000
1926 Total	32,293,000	33,000	9,438,000	22,565,000	.....
January, 1927	2,570,000	81,000	864,000	1,496,000	7,867,000
February	2,345,000	.....	620,000	1,231,000	8,361,000
March	2,754,000	149,000	895,000	2,334,000	8,035,000
April	2,615,000	1,000	763,000	1,712,000	8,176,000
May	2,625,000	1,000	863,000	1,928,000	8,011,000
June	2,571,000	1,000	758,000	2,197,000	7,628,000
July	2,672,000	*	993,000	*1,811,000	7,496,000
August	2,752,000	1,000	754,000	2,004,000	7,491,000
September	2,782,000	.....	861,000	1,965,000	7,447,000
October	2,757,000	1,000	839,000	1,782,000	7,584,000
*Revised					
WAX (Pounds)					
January, 1926	53,015,000	632,000	29,061,000	18,204,000	122,773,000
February	50,307,000	668,000	28,709,000	21,075,000	123,964,000
March	55,714,000	456,000	25,005,000	24,788,000	130,341,000
April	55,371,000	647,000	31,560,000	18,715,000	136,084,000
May	56,135,000	213,000	23,968,000	19,068,000	149,396,000
June	50,673,000	833,000	27,300,000	18,348,000	155,254,000
July	54,267,000	2,089,000	30,768,000	24,138,000	156,704,000
August	54,441,000	968,000	26,906,000	20,142,000	165,065,000
September	49,228,000	252,000	29,303,000	25,463,000	159,779,000
October	56,011,000	1,384,000	28,365,000	20,884,000	167,925,000
November	54,678,000	674,000	25,164,000	21,059,000	177,054,000
December	55,950,000	1,189,000	28,410,000	20,452,000	185,331,000
1926 Total	645,790,000	10,005,000	334,519,000	252,336,000	.....
January, 1927	54,114,000	460,000	29,228,000	17,842,000	192,835,000
February	47,363,000	2,048,000	23,623,000	20,171,000	198,452,000
March	53,644,000	910,000	28,205,000	23,461,000	201,340,000
April	48,917,000	1,505,000	25,421,000	15,322,000	211,019,000
May	46,267,000	729,000	25,228,000	25,458,000	207,329,000
June	44,938,000	400,000	24,200,000	29,659,000	198,808,000
July	47,979,000	2,789,000	25,970,000	32,105,000	191,501,000
August	41,576,000	2,656,000	34,229,000	20,859,000	180,645,000
September	47,888,000	3,040,000	31,780,000	29,621,000	170,172,000
October	49,476,000	887,000	28,342,000	21,826,000	170,367,000
GAS and FUEL OILS (Bbls.)					
January, 1926	28,981,000	863,000	3,612,000	.....	*23,266,000
February	27,094,000	1,585,000	3,190,000	.....	*21,445,000
March	29,824,000	947,000	2,345,000	.....	*20,037,000
April	29,029,000	1,148,000	3,475,000	.....	*19,788,000
May	30,380,000	1,368,000	2,735,000	.....	*20,858,000
June	29,130,000	1,856,000	3,370,000	.....	*22,554,000
July	31,461,000	1,485,000	2,427,000	.....	*25,696,000
August	31,154,000	1,629,000	3,582,000	.....	*26,500,000
September	30,698,000	817,000	2,750,000	.....	*27,151,000
October	32,444,000	857,000	2,015,000	.....	*26,376,000
November	31,624,000	1,111,000	5,020,000	.....	*26,859,000
December	33,376,000	764,000	3,830,000	.....	*24,898,000
1926 Total	365,195,000	14,430,000	38,351,000	.....	.....
January, 1927	32,936,000	660,000	3,732,000	.....	*23,195,000
February	30,185,000	1,053,000	3,812,000	.....	*22,099,000
March	32,377,000	525,000	3,657,000	.....	*22,561,000
April	31,856,000	805,000	3,325,000	.....	*23,732,000
May	33,499,000	826,000	4,544,000	.....	*26,059,000
June	31,691,000	851,000	4,278,000	.....	*26,590,000
July	33,693,000	849,000	4,047,000	.....	*28,890,000
August	34,098,000	391,000	4,639,000	.....	*30,346,000
September	32,339,000	341,000	3,258,000	.....	*31,631,000
October	34,045,000	667,000	4,206,000	.....	33,191,000

*These stocks for east of California only.

to 88,900 barrels in October, production having been curtailed in the East Coast, Oklahoma-Kansas, Louisiana-Arkansas and California districts. Shipments averaged 84,516 barrels compared with 94,200 barrels in September. Shipments averaged less in all but the Appalachian and California districts.

The lube output of the Appalachian district, 13,483 barrels daily average, is third in volume in the country, being exceeded by East Coast and Texas Gulf Coast plants. Mid-Continent refineries averaged 7,418 barrels of lubes a day, or 55 per cent of the volume produced in the Appalachian field. California plants put out an average of 5,968 barrels a day in October. This volume was 80 per cent as much as made by the Mid-Continent plants or that group around Kansas City in Missouri, and in Kansas, Oklahoma, and Texas outside the Gulf Coast. California plants produced 44.2 per cent as much as the Appalachian refineries.

Only three refineries grouped by the Bureau of Mines in the Appalachian districts have a capacity of more than 5,000 barrels a day. These three are the Standard Oil Co. of Ohio at Cleveland, Atlantic Refining Co. at Franklin, Pa., and Vacuum Oil Co. at Olean, N. Y., and none of these three plants is rated as a 10,000-barrel refinery.

Stocks of lubricating oils were reduced at only the Texas Gulf Coastal and California plants. Compared with stocks Oct. 31, 1926, stocks were lower at only the Rocky Mountain and Louisiana Gulf Coast plants.

Total output of wax was 49,476,000 pounds in October, a gain of 1,588,000 pounds, over September output, but the daily average output was unchanged at 1,596,000 pounds. Imports of wax fell from 3,040,000 pounds in September to 887,000 pounds in October, and exports fell from 31,780,000 pounds to 28,342,000 pounds. Domestic demanded was down from 29,621,000 pounds in September to 21,826,000 pounds in October. Stocks rose only 195,000 pounds.

Output of gas and fuel oil was 202,590 barrels daily average more in October than in September. Production was curtailed in only the Oklahoma-Kansas and California districts. Shipments from plants east of California averaged 1.23 per cent more than shipments in September although less oil was moved from the Appalachian, Oklahoma-Kansas and Rocky Mountain districts than in September. East of California stocks were reduced at only the East Coast and Rocky Mountain plants. California fuel oil stocks are grouped with heavy crude oil. Stocks were 25.8 per cent more Oct. 31, 1927, than on Oct. 31, 1926.

The September report was compiled from 329 refineries with a total charging capacity of 2,909,000 barrels a day. These plants were operated at 80 per cent of their rated capacity. In September 329 refineries were operated at 79 per cent of their capacity.

Natural Gasoline By-Products Tested for Use in Gas

WASHINGTON, Dec. 10.—Possibility of using propane and butane, natural gasoline by-products, for enrichment in carburization of water gas for city distribution is forecast in Bureau of Mines experiments, states a bulletin of the department.

The Bureau of Mines experiment included study of properties of low boiling members of the paraffin series, including pentane; calculations of composition and properties of gases of various heating values made with water gas and propane-butane mixtures as enrichments; consideration of changes of enrichment material from gas oil to propane and butane mixtures, and an estimate of influence of such a change on manufacturing costs.

RESULTS of the experiment as given in the bulletin are:

As indicated by the calorific value of the gas at points distant from the gas works the condensation in the mains and distributing system was nil. Prolonged operation using gas enricher gasoline may show that there is a certain amount of condensation in the distributing system, but it is evident that under normal conditions the amount of this condensate will be small and it will not comprise propane, butane and pentane.

The candle power of the finished gas as revealed by mere observation of the gas when burning from a flat-flame burner-tip was somewhat lower than that of ordinary carbureted water gas of the same calorific value when similarly burned. It is believed, however, that this difference in luminosity of the flat-flame jet is of little, if any, importance in the manufacture of city gas.

The specific gravity of the finished gas was rather high, being 0.76 to 0.82. Calculations have been made showing that the density of finished carbureted water-gas using gas enricher gasoline as enricher, need be only slightly greater than that made in the regular way using gas oil, other factors remaining the same.

A small amount of coal tar was produced in the operation of the water gas set, the duration of the tests being too short to measure accurately the quantity which obviously must be very small. It was noted, however, that the tar formed had a high specific gravity and settled readily from water without exhibiting a tendency to form emulsions.

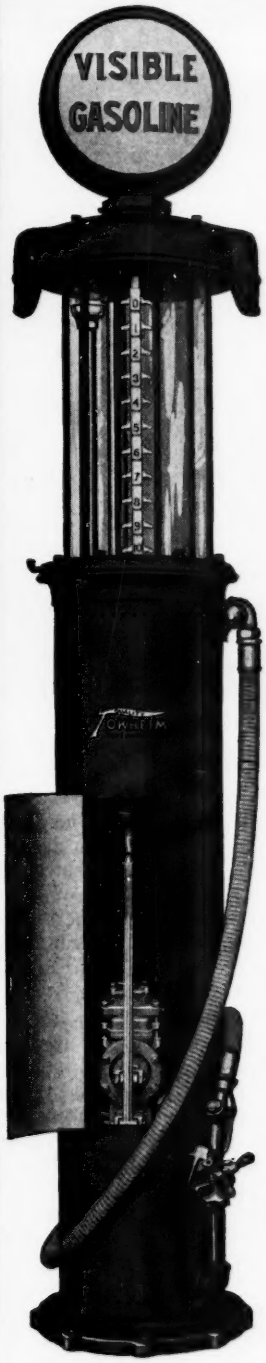
The generator fuel per thousand cubic feet of carbureted gas made increases substantially in proportion to the increased amount of blue gas in the finished product.

THE bulletin stated that in the manufacture and distribution of carbureted water gas substantial economies could be effected by substitution of gas enricher gasoline for gas oil at the same price as gas oil. Consumers at the small city gas works where the Bureau of Mines conducted the test did not complain of the quality of the gas.

Detailed information on the tests are in Serial 2840, which may be obtained from the United States Bureau of Mines, Department of Commerce, Washington.

Gasoline Demand and Supply—Barrels

	Production	Imports	Exports	Domestic Shipments	Stocks End of Month
January, 1926	23,208,000	384,000	3,361,000	17,582,000	41,524,000
February	21,259,000	408,000	3,245,000	15,814,000	44,132,000
March	23,868,000	517,000	3,094,000	19,302,000	46,121,000
April	24,296,000	454,000	4,256,000	20,848,000	45,767,000
May	25,271,000	621,000	4,530,000	24,213,000	42,916,000
June	24,946,000	464,000	3,744,000	23,803,000	40,779,000
July	25,504,000	460,000	3,702,000	24,752,000	38,289,000
August	25,942,000	674,000	3,572,000	26,912,000	34,421,000
September	25,360,000	258,000	3,853,000	22,929,000	33,257,000
October	26,337,000	874,000	2,783,000	23,973,000	33,712,000
November	26,245,000	486,000	3,920,000	20,618,000	35,905,000
December	27,498,000	452,000	3,413,000	21,419,000	39,023,000
1926 Total	299,734,000	6,052,000	43,473,000	262,165,000	.....
January, 1927	27,960,000	520,000	3,557,000	17,888,000	46,058,000
February	25,024,000	416,000	3,544,000	18,240,000	49,714,000
March	27,886,000	493,000	3,219,000	22,646,000	52,410,000
April	26,577,000	377,000	3,614,000	23,371,000	52,379,000
May	26,787,000	490,000	4,468,000	26,579,000	48,609,000
June	26,616,000	590,000	4,248,000	27,799,000	43,768,000
July	28,118,000	190,000	3,223,000	29,784,000	39,069,000
August	28,010,000	348,000	4,193,000	29,779,000	33,455,000
September	27,716,000	515,000	3,539,000	28,409,000	29,738,000
October	28,903,000	365,000	3,959,000	25,497,000	29,550,000



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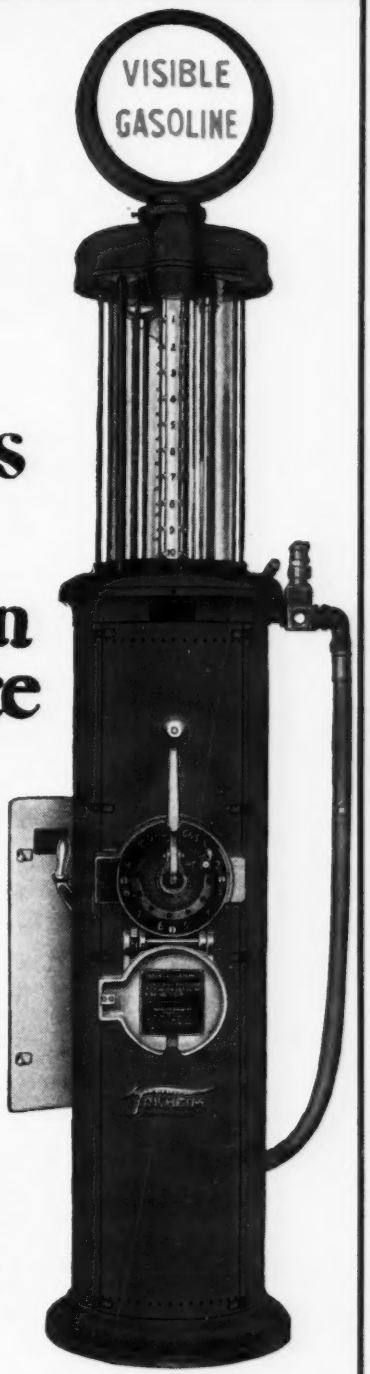

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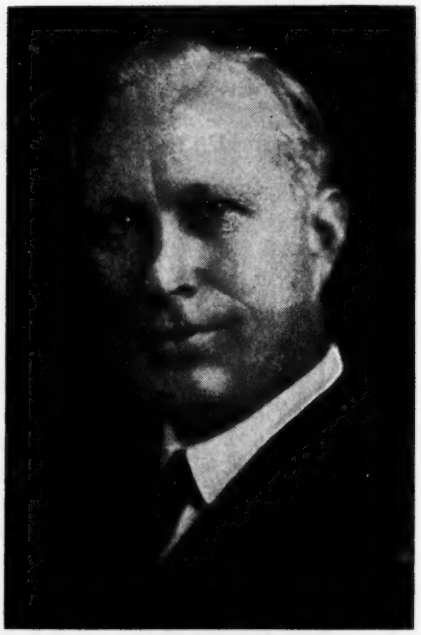
Steel Man Elected Oil Well Supply Head



WALTER C. CARROLL
New President of Oil Well Supply Co., Pittsburgh, Pa.

PITTSBURGH, Pa., Dec. 10.—Walter C. Carroll, who has been for many years in the steel business, was elected on Dec. 5 president of the Oil Well Supply Co. here, effective Jan. 15. Mr. Carroll succeeds Louis Brown, who becomes chairman of the board on that date.

Mr. Carroll has been since 1921 vice president in charge of sheet steel sales for the Inland Steel Co., Chicago. Previous to that he was for 19 years with the American Sheet Steel Co., Vandergrift, Pa., which later became the American Sheet & Tin Plate Co. While with the latter company he was district sales manager at Detroit and assistant to the manager of sales at San Francisco and St. Louis. Later he returned to Pittsburgh as assistant general manager of sales which position he held for 13 years.

Mr. Carroll was graduated from Princeton in 1900 and for two years studied at Harvard law school.

Mr. Brown has been with the company for 36 years, the last 16 of which he was president.

Kimball Is Advertising Manager

UTICA, N. Y., Dec. 10.—Norman F. Kimball has been appointed advertising manager of the American-LaFrance & Foamite Corp. in charge of all advertising and sales promotion. Mr. Kimball has had 15 years experience in the fire protection engineering field, and holds a degree of fire protection engineer conferred by the Armour Institute of Technology.

Some Historical Notes on the Origin Of Contact Filtration

By H. E. Bierce*

THERE has been considerable agitation recently concerning the use of fine-mesh clay in the treatment of mineral oils and a good deal of speculation as to how and when such process was first used. Many erroneous statements have been made due to insufficient knowledge and it may be enlightening to review the historical references which have come to light.

The most efficient results from the use of fuller's earth or clay in the removal of coloring matter or other deleterious substances from oil are obtained by providing the most intimate possible contact between such substances and the clay. Such intimacy of contact can be effected only when the clay is finely ground and when the viscosity of the oil has been reduced through the application of heat.

Such a principle is self-evident and was recognized by the earliest investigators. If the oil is in a high state of fluidity, it is in a better condition to yield up its colloidal impurities; if the clay is in a finely divided state, more faces are presented for the adsorptive action.

The prime requisites of the process operation are therefore to present the clay to the oil as finely divided as is commercially feasible, to reduce the viscosity of the oil or rather to increase its fluidity, and to mix the two together so as to achieve a perfect dispersion or dissemination of the solid matter within the liquid. There are many applications of the process which involve certain variations due to individual requirements and conditions of the oil to be treated, but the general principle of the process is as above stated and this general principle has been recognized since it was first known that certain silicates possessed the power of decolorizing oils.

It has now been well established that in both the contact and percolation methods, the clay functions either wholly or in great part purely because of its adsorptive powers and that each method is an individual adaptation of the same mechanical action, comparative results depending largely upon the conditions under which the two methods are applied.

The word "contact", used to express the idea of agitation of fine-mesh clay with oil as opposed to percolation of oil through clay, is perhaps not the most apt that could have been chosen, as the action of the clay in both cases is dependent on its contact with the oil. The intimacy of such contact is greater in the agitation method and for that reason the word is probably justified.

THE accompanying discussion by H. E. Bierce was prompted by the paper on contact filtration contributed by Max B. Miller to the Special Engineering Issue of NATIONAL PETROLEUM NEWS (Sept. 21, page 44).

"The subject of fine-mesh clay filtration is of extremely wide interest to the refiners of the country just now", Mr. Bierce writes to NATIONAL PETROLEUM NEWS "and I am sure that the facts will be welcomed by many who have been unable to give the subject a careful investigation."

IT IS somewhat generally supposed in American refining circles that the process of contacting mineral oils, particularly the heavier grades which require elevated temperatures to obtain the best results, was first conceived in California in 1920. Such an opinion is due to a misconception of the facts. It is true that two California refineries did actually start the practice of contact filtration at about that time but such action can only be considered as a recent application of an old and well-known art. It is hardly possible to say that a process is new which has been outlined in 20 or more old and expired patents, in technical books of high standing, in various magazines of old issue devoted to technical subjects, and which has been used in the refining processes of many different oils for at least 60 years.

The method of allowing an oil to percolate through a column of sized granular particles of clay, known as the percolation or gravity filtration method, is undeniably an outgrowth of the simpler, more direct and more logical method of mixing the finely-ground clay with the oil. The percolation method was devised to fit certain conditions and it has many advantages as well as disadvantages but to say that it preceded contact filtration is a misstatement of facts.

In order to place the two mehods in their proper chronological position, it is only necessary to carefully study the literature relating to the subject and to grasp the reason for the start of the percolation process. Up to the last decade of the nineteenth century practically all American mineral oil lubricants were produced from Pennsylvania crude, in most cases a crude of unmixed paraffin base character. The refinery products coming from this crude did not require a severe treatment to condition them for marketing and even up to this day the average Pennsylvania refinery will not countenance the use of acid in finishing its viscous oils.

Production in these earlier plants was comparatively very small and speed of operation was not a vital consideration. The result was that their refining process included a single treatment with fuller's earth and the simplest method of obtaining this treatment, under the conditions which then prevailed, was to filter the oil through a column of the earth. This practice then spread to other parts of the country, largely because it was being used successfully in Pennsylvania, and it became a well-known and accepted part of the general refining process, effectively stopping the development of fine-mesh clay for similar purposes for the time being.

WHEN gravity filtration was being taken up by the early Pennsylvania refiners, the American vegetable oil refiners were accepting the contact process because they recognized its simplicity and efficiency for their work. The earliest records of both methods are found in European literature and both were well-known in their application to vegetable and mineral oils. Even when percolation had been generally accepted by the mineral oil refiners of this country, the older method of moxing the fine powdered earth with the oil was well-known to most of the refiners of that day, but when it did not develop along with other refining methods, it became largely unknown to most of the later generation.

The use of fine clay on light oils was practiced from time to time but the development of the process for the heavier grades was delayed until the natural evolution of the industry with its attendant quantity production forced real consideration of its merits upon the refineries. It was therefore natural that a certain pro-

*General manager, Western Clay Metals Co.

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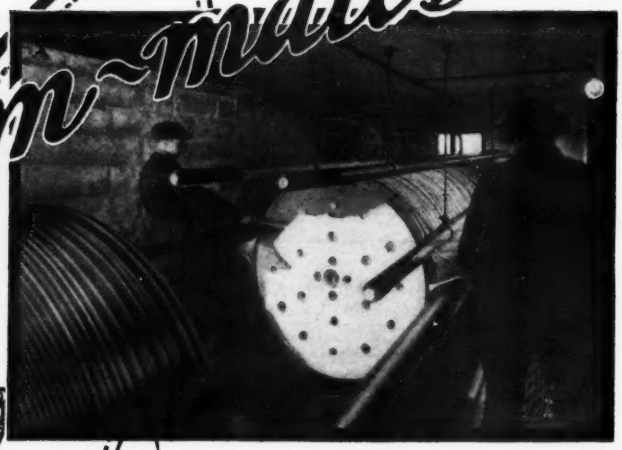

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portion of refinery men should accept it as something new when finally its use was re-established even though it is as thoroughly described in technical literature as is the percolation method.

THE use of the contact process as initiated in California in recent years was due primarily to the high cost of properly sized granular fuller's earth. The yield of filtered oils per ton of such earth was low and its transportation cost was high, resulting in a high filtration charge being assessed against an oil which brought a comparatively low selling price.

The conditions were ideal to stimulate research and development. The original California work, however, did not contemplate the use of fine-mesh natural untreated clay. The use of such material on a large scale came later. The immediate aim was to produce a very high grade efficient decolorant which would increase the yield of filtered oil for any given quantity of the decolorant to a point of true economy even though the cost of such activation of the clay was high. This ambition resulted in finding many deposits of clay in the Mountain and Pacific coast states which were amenable to treatment with sulfuric or hydrochloric acid under a process which had previously been developed in Germany and which has been in commercial practice there for at least two decades.

Not all decolorizing clays by any means can be activated by such treatment but many deposits have been found in the western part of the United States yielding clays which can be so treated with great increase of their natural decolorizing activity and which compare very favorably in quality with the foreign acid-treated clays. However, it was found that the cost of acid treament of the clay was high, although there is still a considerable amount of such activated products used.

The work that was done in California at least created great general interest in the use of fine-mesh clay as applied to mineral oils and brought into the work many influences which have all contributed to the gradual adoption of the process throughout the country.

As a matter of interest it may be stated that activation of clay by treatment with either concentrated or dilute acids has been practiced for many years in Europe. It is stated in Ullmann's Encyclopaedia of Technical Chemistry and the firms of Smith and Field of London have been using artificial silicates since 1873 for decolorization purposes. The well-known German clays, Frankonit and Tonsil, are listed as artificial products produced through the action of acid on natural earth silicates. An article in "Seifensieder Zeitung" of 1913 refers

to Tonsil as an excellent bleaching agent and attributes its properties to a high silicic acid content.

Other articles in German technical literature, as well as German patents No. 304,076 and No. 305,-452, fully disclose the method of treatment of clay with acids to increase its decolorizing effect. Such treatment is further suggested by J. P. Porter in U. S. Geological Survey Bulletin No. 315.

In fact, the idea of activating clay with acid is nearly as old as the use of clay for oil decolorization. It was so well known that it is said another German patent, No. 339,919, was annulled through the action brought by a certain German manufacturer of acid treated clay on the contention that the principles involved in such patent were old and well-known at the time of its issue as disclosed in priority literature, both patent and technical, and by priority use. The brief filed by such German manufacturer of acid treated clay further states that a well-known firm in Germany has been producing acid-treated clay on a commercial scale since 1910.

It has been found that, generally speaking, modern large-capacity refineries can employ contact filtration to advantage because of: (1) real economy of operation as compared with gravity filtration; (2) increased flexibility and speed of operation; (3) decreased initial investment and decreased equipment investment for replacements; (4) beneficial effect on other units of the lubricating division. Basing the real merit of the process on the proven character of the points as enumerated, it will be seen that it must eventually be adopted by a vast majority of plants; and by the same token, we must admit that the average refinery has been rather slow to profit by information which has been available over a period of many years, as shown by the following facts:

The first authentic description of the use of clay in the purification of oil by the method of mixing it with the oil is contained in British Provisional Specification No. 1211 by Benjamin Fullwood of May 28, 1855. This publication of a process which was later to become so well-known is only a short and incomplete mention of the fact that the inventor obtains a "Purification of such mineral, vegetable and animal matters as contain oily . . . qualities" by adding thereto "alumina, or aluminous or argillaceous clay, and agitate or mix well therewith in a suitable vessel for about half an hour by any convenient mechanical means".

But the first full and complete disclosure of the modern dry contacting method so far found is in British Provisional Specification No. 2721 of 1867 and in British Patents No. 648 and No. 2356 of 1868, issued to F. Lambe, A. C. Sterry and John Fordred. The latter was a chemist employed by Lambe and Sterry in their refinery at Rotherhithe, London.

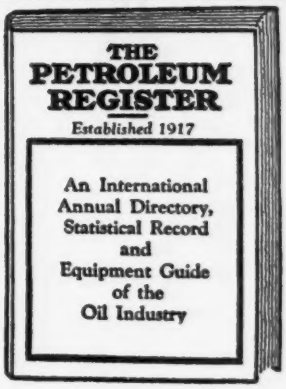
These patents are so clear and so well cover every important phase of modern dry contacting as to assure any reader that Fordred was a man of ability as well as foresight. He first obtained provisional protection under No. 2721 on his method of treating paraffin with fine-mesh clay, and when subsequent investigations led him into the field of other petroleum products, and of petroleum itself, he obtained, first, his patent No. 648 on "Improvements in Purifying Hydrocarbon Oils", and second, his patent No. 2356 on "Improvements in Treating Animal and Vegetable Oils, Fats, Fatty Acids, Wax, Resin, Essential Oils, Balsams and the Solid and Liquid Hydrocarbons".

WHILE evidently recognizing the essential equivalency implied in the treatment of these various materials, his description of his invention betrays the fact that he was thinking of and dealing primarily with hydrocarbon oils. Patent No. 648 covers the treatment of hydrocarbon oils first with sulfuric acid and then with "fuller's earth in fine powder", or its equivalent, agitation of the oil-clay mixture, elevation of the temperature, and separation of the oil from the clay.

After a very clear description of the manner and purpose of his invention, his claim reads as follows: "The treatment of refined or partially refined hydrocarbon oils with fuller's earth, or the substances mentioned as its equivalent, in the manner and for the purpose set forth".

Patent No. 2356 is an elaboration of the same idea and covers the treatment of distillable oils, including hydrocarbons, and also the treatment of products obtained by such distillation. Again in this patent, his description is particularly clear and he follows it with the following claim: "Distilling vegetable and mineral resins, essential oils, balsams, fatty acids and the solid and liquid hydrocarbons in contact with fuller's earth or its equivalent, as described".

This of course is a very complete disclosure of the method as used in the treatment of crudes, long residuums, waste oils containing light ends, and any stock in solution such as the final reduction after de-waxing. Under this patent, the clay is used in the still during the process of distillation, a practice which has been followed by at least three plants in the United States since 1922. Fordred's choice of the words "in contact with" probably marks the first use of the word "contact" as applied to fine-mesh clay adsorption refining. Both of these patents are very complete in that practically all conditions are mentioned, such as the usual preliminary acid treatment, presenting



The Petroleum Register 1927

is now off the press, with hundreds of new listings. It combines in one book the following:

A comprehensive directory of equipment used in the oil business, with names and addresses of manufacturers and dealers.

Refiners—officers, capital stock, properties, summary of latest financial reports.

Producers—thousands of companies engaged in producing and exploring for oil.

Marketers and Jobbers: A new arrangement this year, listing companies alphabetically by states; also grease manufacturers, pipe line companies, natural gasoline manufacturers, drilling contractors and foreign companies.

Personnel Department: Alphabetical directory of executives of leading oil companies and their positions; reproduction of lease forms used by producers and prospectors.

Important new features: Obsolete oil companies, full roster of American Association of Petroleum Geologists; complete list of tank steamers and fuel oil bunkering stations.

Gasoline plants; Trade names of leading brands of petroleum products; Secretaries and headquarters of oil associations.

610 pages of important information for oil men, banks, brokers, manufacturers and equipment dealers.

National Petroleum News
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Cleveland, Ohio

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Tret-O-lite
Plant
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Operators usually can arrange a Tret-O-litE plant, using equipment already on the lease. No heavy initial investment—no expensive equipment to stand idle when need for large treating capacity has passed.

The Tret-O-litE method is the fast, economical and THOROUGH method of recovering oil from emulsions.

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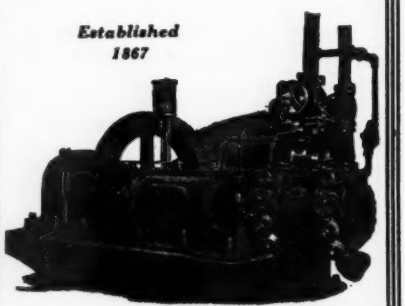

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the clay to the oil in the acid state, a full range of amounts of clay to be used, duration of the time of contact, a full range of temperatures involved, etc.

THE Fordred patent No. 2356 is also of interest as showing the application of similar methods to the treatment of a wide variety of materials, including animal, vegetable and mineral oils, fats and waxes, so that it could not be considered after the issuance of this patent, a novel idea to apply to mineral oils any process which up to the time of such application had previously been used for the treatment of any materials included in his list. The fact that his patent covers these other materials established an early recognition of the equivalency existing between the refining and decolorizing treatments of oils, whether animal, vegetable or mineral, and of paraffin or natural ceresin.

Whether or not Fordred's work on paraffin was original with him, substantially his method was used from that time on in the refining of ozokerite or natural ceresin.

In the Austrian field, the method was in common use from the inception of the ozokerite industry. A complete description of this process is given in Redwood, in the Mineral Industry of 1893, and in various articles by Edgar von Boyen, the latter being an authority on the subject. All such references mention the use of "decolorizing powders" and "de-acidifying powders" which are used for the removal of color after the ceresin has been acid treated and is still in the acid condition. Many points of similarity are noticed in such descriptions with the various points encountered in the present rapid development of the process and it is clear that these refiners of ozokerite encountered many of the same problems that are found in modern contacting plants.

It is of course well known that animal and vegetable oil refineries have employed the contact process for many years. In the case of lard, the treatment by agitation with clay obtained by mechanical means and at slightly elevated temperatures, with subsequent elimination of the clay in a filter press, is sufficient to produce a satisfactory product.

In the case of crude cotton oil, for example. the oil is now generally treated with a caustic soda solution for the reduction of the free fatty acid with an accompanying removal of much of the color and after a complete settling of the foots, the refined oil is subjected to agitation with clay at the proper temperature and then passed through a filter press for the removal of the clay.

There is therefore no basic difference in modern contacting when applied to any of the materials mentioned by Fordred, that is to say, to wax, animal oil, vegetable oils or mineral oils; and it is perhaps not going too far to say that Fordred may be considered as the originator of the idea in its widest application.

Following Fordred, patent literature is full of disclosures which show how much thought was given to this subject. While a full discussion of such references cannot be attempted here, no history of the process would be complete without at least a few of them in order to show the continuing effort expended to produce better decolorizing methods.

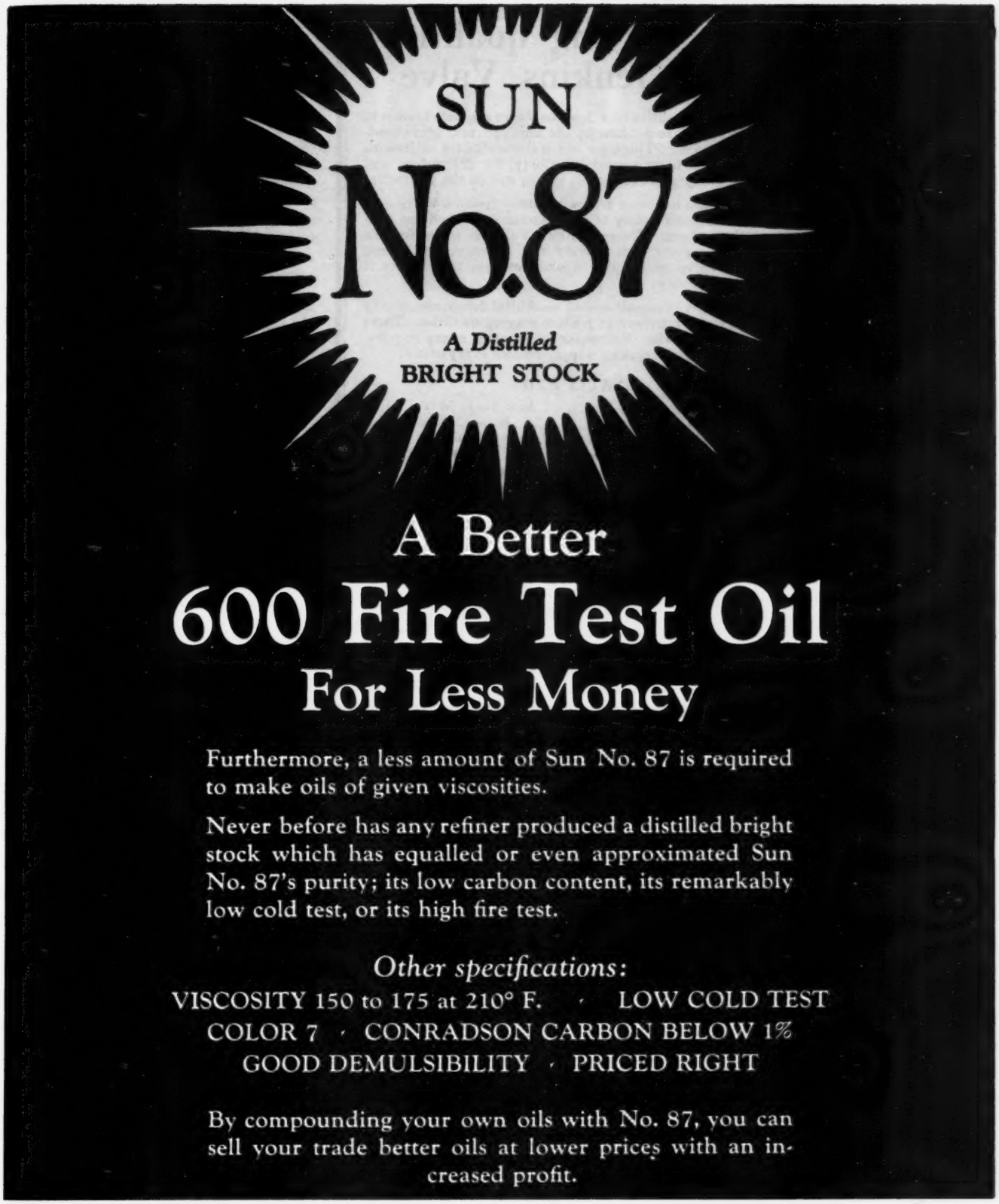
BRITISH patent No. 3942 of 1873 discloses the bleaching of solid and liquid hydrocarbons by agitation with hydrated silicates of magnesia, lime, etc., and aluminate of magnesia, the decolorizing agent being used in powdered form and mixed by agitation with the oil to be treated. German patents to Victor Ritter von Ofenheim, Nos. 9291 and 9981 of 1879, describe the treatment of ozokerite, petroleum, fats and oils by heating the material to be treated to the proper temperature after adding hydrated clay and various oxides, in the form of a fine powder and agitating for a suitable length of time, then cooling to a suitable temperature and drawing off the treated material.

The later of these patents also mentions that the percolation method may be substituted for the agitation method, showing that these two methods were then recognized as substantially equivalent or alternative methods.

Beginning in 1880, there are several United States patents which cover this same subject, the more important being first, U. S. patent No. 233,453 of 1880 to Winter; U. S. patent No. 299,-324 of 1884 to Baynes and Fearenside; U. S. patent No. 408,472 of 1889 to Field and U. S. patent No. 565,039 of 1896 to Saybolt. Of these, the Field patent is probably the most interesting because of the fact that he shows successive treatments of the oil with acid and clay to obtain a completely decolorized product.

Saybolt also mentions that if desirable the oil may be passed through a filter containing his adsorbent material in lieu of his preferred procedure embodying agitation of the powdered material with the oil, showing again the well recognized equivalency of the agitation and percolation methods.

In technical literature, articles on contact filtration include the following: Journal of the Society of Chemical Industry of July 30, 1904, page 755; Redwood, a "Treatise on Petroleum", edition of 1913 and also earlier editions; "American Petroleum Industry", by Bacon and Hamor, published 1916,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Never before has any refiner produced a distilled bright stock which has equalled or even approximated Sun No. 87's purity; its low carbon content, its remarkably low cold test, or its high fire test.
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COLOR 7 · CONRADSON CARBON BELOW 1%
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By compounding your own oils with No. 87, you can sell your trade better oils at lower prices with an increased profit.

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Fig. 106
Screwed, Jenkins Standard Bronze Globe Valve

Fig. 108
Screwed, Jenkins Standard Bronze Angle Valve

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The staying qualities of a Jenkins Valve are well-known to engineers who use Jenkins by the hundred, and who standardize on them. There are not a few instances of Jenkins Valves which have served for thirty, for thirty-five, and even for forty years and over, valves still on the job today.

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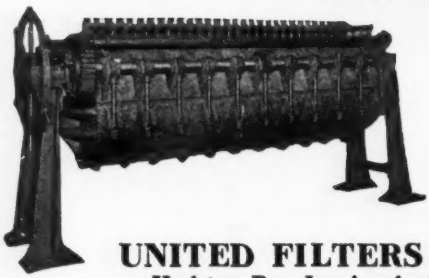
Doctor Solutions and Sweetland Filters



EVEN when their work is done, doctor solutions still have values in them—if clarified, they can be used over again; and the PbS recovered by clarification is marketable.
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Our engineers will be glad to advise on this matter.

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Export Office—25 Broadway, N. Y.—Code Address, Unifilter, New York

page 614; and an article in "Petroleum", 1907, page 292 by E. Graefe.

The specific references given herewith constitute only a portion of the available historical data relating to the use of the process but they are ample to prove the contention that the use of fine-mesh clay has been known for many years and was early recognized as the natural and logical way to utilize the adsorptive qualities of certain silicates. Viewing it from the economic standpoint, it is also manifestly the best method for properly utilizing the clay resources of the country, as the production of a granular filtering medium is a wasteful operation employing as it does only certain deposits and only a portion of the total clay mined from those deposits.

Such a condition must in time certainly result in higher prices for such specially sized products, while sufficient tonnage of good quality uniform clay for contacting has been developed to insure firm prices for many years to come. Both users and producers are anxious to improve the quality of clay and to provide better mechanical means for its utilization. Some problems have been overcome and it is safe to assume that further progress will be made.

Engineer-Inventor Dies

ELIZABETH, N. J., Dec. 8.—Herbert Meisterknecht, vice-president and chief engineer of Emmo Engineering Co. here, died on Nov. 14.

For 18 months Mr. Meisterknecht had specialized in gasoline and oil equipment. He invented an engine which runs on ordinary fuel oil. A model of it furnished power for his laboratory shop at Highlands, N. J., Peter J. Olde, president of the company said.

Mr. Meisterknecht also invented a meter for visible gasoline pumps, which the Emmo company is about to market.

He was graduated from Columbia university, and was a member of the American Society of Mechanical Engineers. He served in the U. S. Navy during the war as commander of a destroyer on convoy duty.

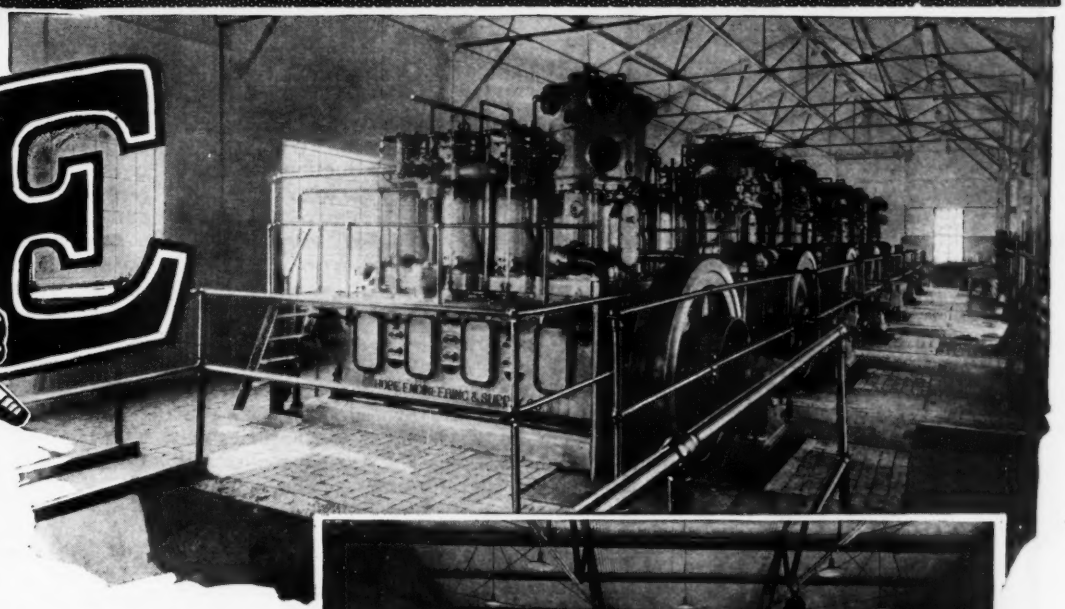
Transferred to Ft. Worth Office

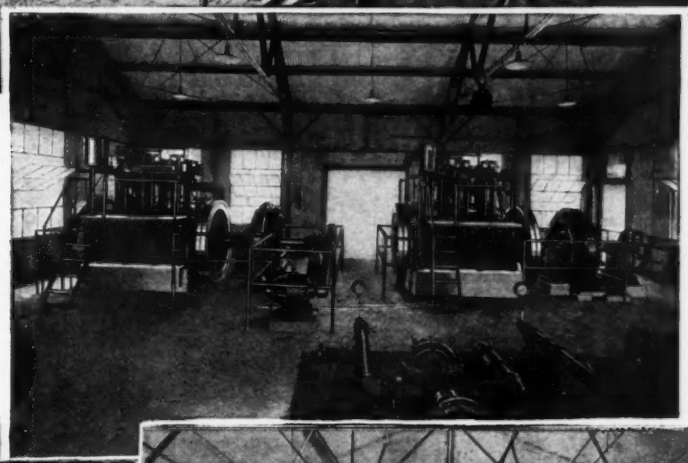
LOS ANGELES, Dec. 8.—Dan L. Mahoney, of the Sinclair Crude Oil Purchasing Co. in California for the past several months, left for Tulsa Dec. 3 and expects to work out of the Sinclair office at Fort Worth.

George Snedden, independent producer of Tulsa, has returned to Oklahoma after a business trip to west Texas.

DESIGNERS

PE





Hope activities cover the nation, from coast to coast and from Canada to Mexico. No job is too small to interest the Hope Company — no job is too large or complicated for it to handle with speed and success — from the financing to the completion and delivery.

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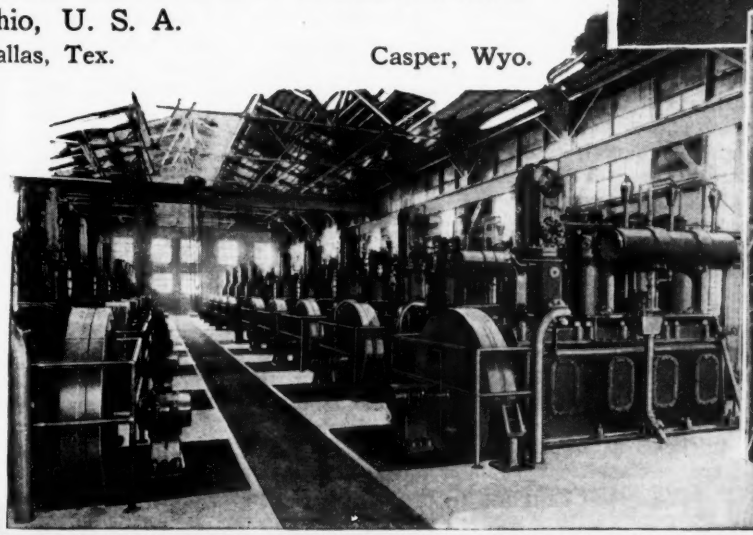

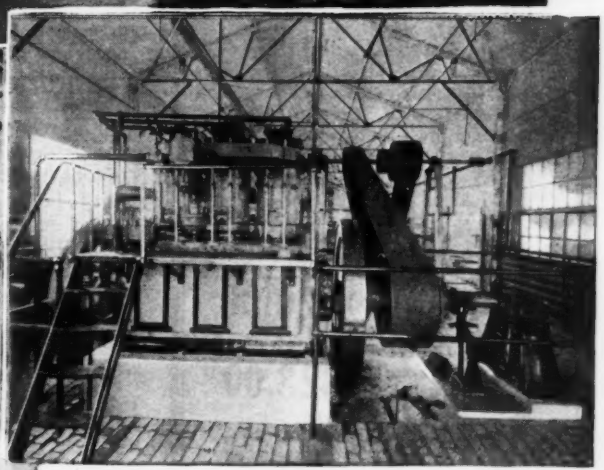

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A specially designed intake valve prevents oil from backing into air valve. Comes equipped with seven feet of durable hose and vaporizing nozzle with middle valve control.

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Price with five gallons Kellogg Graphite Penetrating Oil..... **$28.00**

Kellogg Graphite Penetrating Oil is compounded from eleven different oils and ingredients, each one performing a definite purpose in cleaning, cutting rust, penetrating and lubricating.

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Rochester, N. Y.

KELLOGG COMPRESSORS

Equipment Used in Yates Field Simple but Effective

By Paul Wagner
N. P. N. STAFF WRITER

BECAUSE of the high initial productions of Yates field, Texas, wells, all of which come in flowing, the question of well-head equipment is of peculiar interest. Wells rated at potential daily productions ranging from 5,000 to 65,000 barrels, notwithstanding their relatively shallow depths of 915-1675 feet, give up their oil under great pressures.

Flow nipples, or small lines direct from wells to the traps, control the volume produced and the pressure held at the well in the Yates field. Various types of flow nipples are used, but a favored type is that made in the form of a Venturi tube, which is adjustable and permits the size of the opening to be changed without disturbing the flow of a well.

Well-head connections used in the field are of various types. Simms Oil Co. uses a steel cross with 4-inch outlets placed between the master gate and control head. Mid-Kansas Oil & Gas Co., operating Transcontinental Oil Co. acreage, uses a tee above the master gate of the same size as the casing in the hole. Smaller lines are connected from this tee by means of swedge nipples. Other operators place control head above the master gate and run lines from the control to the separator.

All Yates field wells are equipped with separators. The No. 1 Smith separator is the type most commonly used, although one company is using six American separators.

Bolted steel tanks are in general use on leases. These vary in size from the high 500-barrel tanks to 5,000-barrel tanks, those of larger capacity being favored because of the size of wells commonly drilled in the field. Practically all tanks are vapor tight.

Cable tool drilling methods have been universally used in the field, for which conditions are ideal. It has been suggested, however, that use of the rotary method would save a string of pipe and wells could be drilled quicker after passing through the hard surface rock found in some parts of the field. The rock could be drilled through with a spudding machine or by use of rock bits on the rotary with pull down attachment.

Drilling machines of the National and Star types, and some Fort Worth spudders, are used for drilling more than 50 per cent of the wells, because of their relatively shallow depth. There appears to be a tendency on the part of operators, however, to use more standard rigs.

Cementing of certain strings of pipe is now a universal practice. The Halliburton method is most generally used, although some strings of pipe have been cemented by the dump bailer method.

Best practice in the field calls for the landing of a string of pipe of proper size below the third upper water zone found at drilling depths of 190 to 710 feet, depending on surface elevation and location on structure.

The second string is set below the sulfur water zone and cemented up to the first string, or, if the first string is pulled, it is cemented to the surface.

A third, or oil, string is landed and cemented on top of the lime wherever possible, or in other cases landed and cemented as close to the top of the pay as possible.

Two types of casing programs are followed in the field. These call for 12½-inch, 10-inch and 8¼-inch strings, on the one hand, and 10-inch, 8¼-inch and 6⅝-inch, on the other. By pulling the 12½-inch casing, it is possible to complete wells drilled under the larger casing program at costs varying from $7,000 to $15,000, depending on road building, transportation charges and other unusual expense affecting individual locations. Similarly, by pulling the 10-inch string in the case of the smaller casing program completion costs will vary from $6,800 to $14,000. These figures are based on contract drilling at $3.50 to $5.50 a foot.

Cost figures mentioned do not include lease lines, tank batteries and similar equipment. They do include, however, an arbitrary estimate of $1,000 to be reckoned with for the cementing of any well.

In West Texas fields where treating has been necessary good success in breaking down emulsion has resulted from using Tret-o-lite, which also helps to drop free water out of the oil. In Yates field it is recommended that Tret-o-lite should be injected into the flow line by means of a lubricator before the fluid reaches the flow nipple. This method, which has been found satisfactory in the University (Church & Fields) pool of Crane county, where characteristics of the oil are similar to that produced in the Yates area, allows intimate mixture of oil, water and Tret-o-lite at the choke, increasing the time in which chemical action takes place.

GREAT in the JUNGLE

But not for Fords

The chattering of monkeys and the shimmy are—"great in the jungle"—But not for Fords. Fords were not meant to chatter and shimmy and they never will —if **MARATHON** Motor Oil "F" for Fords is used.

MARATHON Motor Oil "F" for Fords is made especially for Fords from a paraffined base crude oil, and will keep a Ford running well for years if just ordinary care is exercised.

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Our Industry — A Page of Facts and Personalities

National Petroleum News

By Paul Wagner

WHEN the Pecos county prorating committee began consideration of an acreage basis to replace the potential production system of establishing equitable pipeline runs it retained J. Elmer Thomas, consulting geologist of Forth Worth, to work with the geological departments of Yates field operating companies. Thomas in 1917 was the first president of the American Association of Petroleum Geologists. Since that time he has been active in association affairs.

Mr. Thomas was educated at the University of Chicago, where he won a senior honorary scholarship in geology and where he got his S.B. degree in 1912. He was a field assistant on the United States Geological Survey at Glacier National Park, Montana, in the summer of 1911. He served the American Smelting & Refining Co. in Coahuila, Mexico, in 1912-1913. In the winter of 1914, he became geologist at Tulsa of the Minnehoma Oil Co., from which position he resigned to become chief geologist of the Chicago Oil Co. in December, 1915. He was chief geologist of Sinclair Oil & Gas Co. at Tulsa, in 1916-1917, and later chief geologist of the Illinois Oil Corp at Tulsa. Following air service in the World War, he was a consulting geologist at San Antonio in 1919-1920, and chief geologist of the Shaffer Oil & Refining Co. at Chicago 1921-1924.

* * *

THE sale of partnership properties of Bridwell & Heydrick in the Greater Wichita Falls district to the Reno Oil Co., of Sistersville, West Virginia, does not mean the retirement of J. S. Bridwell and "Buck" Heydrick from the oil business. They retain their interests in properties owned jointly with other operating interests. The deal affected about 1000 acres, 154 wells and net daily production of 840 barrels. Consideration was reported at $1,000,000.

* * *

VIRGIL B. COLE, who spent the summer in South America doing geological work, is now at Shawnee, Okla., for the Carter Oil Co., full subsidiary in the Mid-Continent of the Standard Oil Co. of New Jersey.

* * *

FRANK C. LAURIE, formerly Tampico manager of the Metropolitan Oil Co., made a business trip to Mexico from his Los Angeles home in November.

E. A. LANDRETH

ED A. LANDRETH, independent operator, who recently moved his headquarters from Breckenridge to Forth Worth, is one of the most widely known producers in north central and west Texas. After originally coming into prominence as an oil man in the Breckenridge field of Stephens county, Mr. Landreth operated in the Wilbarger area of the Greater Wichita Falls district before turning his attention to west Texas. He and his associates in the Landreth Production Corp., which he heads, are now drilling up the famous Cowden excess survey strip which separates the University (Church & Fields) pool of Crane county from the McElroy ranch development of the Gulf Production Co. Landreth's production on the Cowden strip, which is four miles long and only wide enough to permit of one location between offset derricks, has been developed enough to give him 8,000 to 12,000 barrels crude oil production daily over a period of time. Landreth has elected to tank his crude against the future, building vast storage facilities on the strip.

Landreth is a devotee of golf and may be found taking his recreation regularly at the Rivercrest Country Club in Fort Worth.

* * *

PITY the financial position of C. S. Gulbenkian, Iraq financier, who retains a 5 per cent interest in the Turkish Petroleum Co., formed jointly to operate the Kirkuk properties in the region of the Tigris and Euphrates rivers. This modern Aladdin participates with the Anglo-Persian, Royal Dutch-Shell, American and French groups of companies in the ownership of properties on which is located a recently completed well estimated good for 50,000 barrels daily production. Each of the four groups owns 23.5 per cent of the company, Gulbenkian retaining his 5 per cent for services in obtaining the Kirkuk concession.

Iraq's entry into the world picture as a major source of crude oil production is of peculiar interest because the region is known historically as the cradle of civilization. It was there in Mesopotamia, as the region has been known for centuries, that the traditional Garden of Eden was located, and later Mesopotamia teemed with the legends of the Arabian Nights.

* * *

WILLIAM H. LYNE, formerly Gulf Coastal district general superintendent of The Texas Co. at Houston, is in charge of drilling operations for the Liafail Development Syndicate on El Descanso Rancho, in Lower California, Mexico. A test well now drilling below 1650 feet was financed by a close corporation consisting of Gen. A. L. Rodriquez, governor of Baja, California; Mariano Escabado, well known financier, who is president of the syndicate; Talbot Mundy, Point Loma, Cal., widely known author of adventure fiction, who is secretary; W. H. Black of San Diego, Cal., vice-president. The property on which the test is drilling totals 47,000 acres.

* * *

E. N. HALFIN, formerly of Tampico, is in charge of a wildcat test being drilled in Colombia, South America, for the Lobitis Oil Corp., of London. Drillers Gahn and Lou Dungan of the Martin Engineering Co., are also on the job working with Mr. Halfin.

* * *

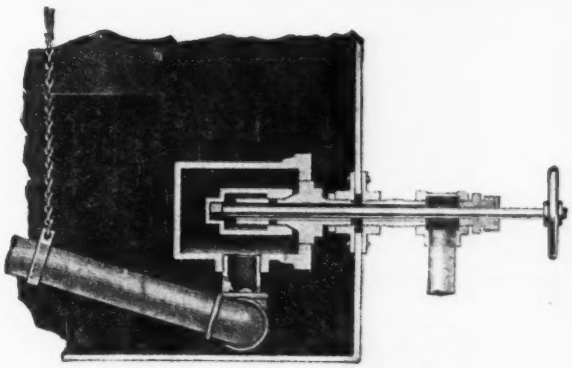
K. R. MARSH, formerly a geologist in the Pure Oil Co. and Standard Oil Co. of New Jersey organizations, has formed the Western Petroleum & Royalty Corp., under the laws of Nevada, and will maintain headquarters in Fort Worth.

* * *

J. K. KESTER has returned to his home at Parkersburg, West Virginia, where he will locate after resigning from the Transcontinental Petroleum Co., in the Cacalillao field of Mexico.

ANNOUNCING

The HUTCHINGS *non-freeze* TANK VALVE



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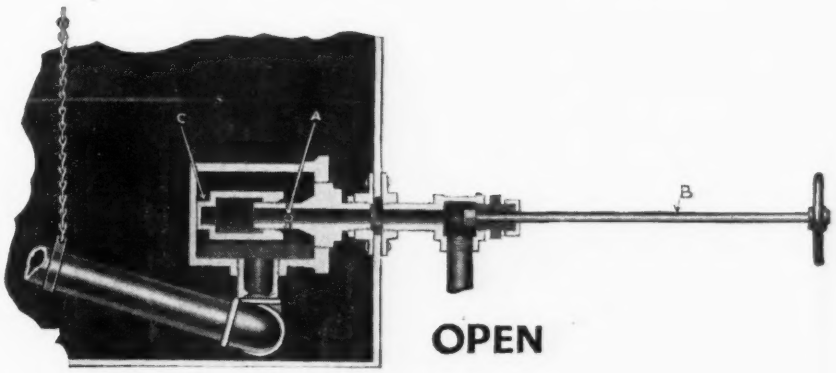
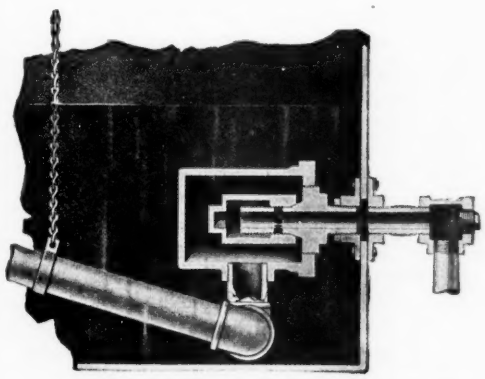


OPEN



CLOSED-
WRENCH
REMOVED

The opening and closing mechanism on the HUTCHINGS Valve is *inside the tank*. When closed, therefore, there is no liquid in the exterior portion and no danger of freezing. No need of boxing, in cold weather.

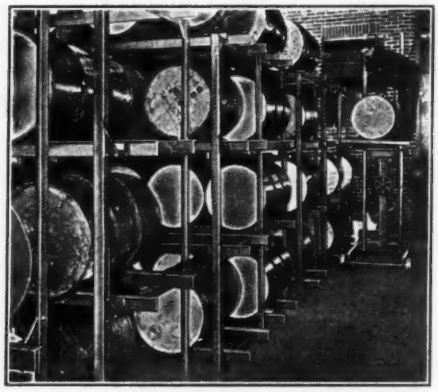
Again, the exterior portion can be broken off by heaving or floods, without affecting the valve proper.

OPERATION: "A" indicates the port holes thru which liquid enters the flow line. The long "wrench", "B", engages the Valve Cap at "C", and the cap can thus be unscrewed to open position in Figure 2, which uncovers the ports. Wrench is then pulled out to Figure 2 position, in order to leave flow line entirely unobstructed. Figure 3 shows valve in closed position with wrench removed and a plug inserted. One wrench can be used for any number of valves.

Types for tanks, tank cars, refinery stills.

WESTCOTT VALVE COMPANY
East St. Louis, Mo.

WESTCOTT

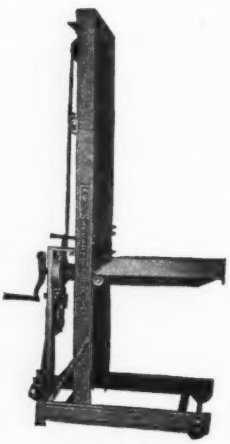


Lewis-Shepard Barrel and Drum Racks are made of channels. You pay for no more steel than necessary. All units arc-welded. Easily assembled. Made to any height and to fit any floor space.

Write us.

Stackers Save Dollars

Hundreds of dollars are saved by scores of concerns in the oil industry every year by using Stackers. They save time, men, floor space. Particularly we recommend for the industry the 500 lb. Stacker shown at the right. Write today for 1927 Catalog. LEWIS-SHEPARD CO., 143 Walnut St., Watertown Station, Boston, Mass.



500 lb. Stacker

A master portable elevator to handle oil drums and barrels more economically. No need to pay more if your loads are 500 lbs. or less. Send for Catalog.

LEWIS-SHEPARD

Oil And Grease Formulas

200 formulas, have been prepared in a simple, non-technical style by Forrest A. Hoff.

They are of value to the refiner, jobber, compounder, broker and lubricating engineer.

Just attach your check to this ad and return it to us now. $15 is the reasonable cost of all this information. Synopsis sent upon request.

National Petroleum News
1213 West 3rd St. **Cleveland, Ohio**

Ohio Producers Consider Building Refinery

LOGAN, O., Dec. 8.—A review of oil industry conditions and plans for the future were discussed at the second annual meeting of the Southeastern Ohio Oil & Gas Producers Association at the Easterling Club here on Nov. 29.

A. D. Hufford, president, told of the trying period through which all branches of the industry had passed this year. He said he believed production conditions in southeastern Ohio could be improved if that section would consume its own production, which led to a discussion of the proposed refinery for this district.

Other speakers were: W. H. Thompson, secretary of the Ohio Gas & Oil Men's Association, Columbus, who discussed co-operation; Harry Barber, who spoke in favor of eliminating the price differential on Macksburg district crude; H. E. Stewart, Columbus; Tom Green and E. J. Mildren, Marietta; and A. E. Faine, New Straitsville.

W. L. Franks, Logan, secretary, reported a membership of 177.

All officers and directors were re-elected, except that Fred Stover, New Matamoras, succeeds the late Harry H. Watson as director.

Officers are: A. D. Hufford, Bremen, president; H. D. Atha, Logan, and O. C. Dunn, Marietta, vice presidents, and W. L. Franks, Logan, secretary-treasurer.

Directors are, besides the foregoing officers and Mr. Stover: A. E. Faine; Alex Le Croix, Lancaster; C. H. Bell, Logan; Warren E. Burns, Marietta; E. J. Mildren; F. W. Douglass, Woodsfield, and H. E. Stewart, Columbus.

Bulletin Out On Heavy Ends

WASHINGTON, D. C., Dec. 8.—A bulletin on the study of the heavier hydro-carbons particularly of 300 degrees Cent. and above boiling point by H. M. Smith, assistant petroleum chemist, has been issued by the Bureau of Mines. The study was made with Salt Creek, Wyoming crude. Copies of the bulletin, which is Serial 2837, may be obtained from the United States Bureau of Mines, Department of Commerce, Washington, D. C.

New Hampshire Boosts Tax

NEW YORK, Dec. 8.—The New Hampshire legislature, at a special one day session Nov. 29, increased the state gasoline tax from 3 cents to 4 cents, the 1 cent increase to become effective Jan. 1, 1928.

Get a tremendous increase in your oil sales with this very successful merchandising plan!

There is a vast oil market awaiting you if you go after it in the right way. That market is made up of three groups—the motorist who likes to lubricate his own car—the farmer who operates a tractor—the owner of a stationary engine. At least 30% of the oil used today is bought by these groups.

Of course, you are selling oil to some of these people now. But your sales don't begin to compare with what they can be if you adopt this great merchandising plan.

Here's the reason: The man who buys oil in quantities wants to be able to handle that oil with the least possible trouble. That means he will buy from the company that packs its lubricants in the most convenient container.

There is no doubt that the Pour-Ezee Drum *is* the most convenient 5-gallon oil "package" ever designed. But do motorists and other users of motor oil in your community know that it is; that the Pour-Ezee Drum tilts for pouring at the touch of the finger; that oil may be taken from it quickly without spilling a drop; that there is no "gulp" as the oil flows out; that the drum rolls back to normal position the moment it is released?

This great merchandising plan gets all these facts before *your* prospects. It sells *your* motor oil on merit, *plus the convenience of having oil packed in the Pour-Ezee Drum.*

Oil companies that have used this and similar merchandising plans have made unusually large increases in their motor oil sales. The Pour-Ezee Drum is in demand *wherever people have been shown its convenience.* One oil company alone has used 78,000 of these unique containers.

Why not be the first in your territory to get the benefit of the Pour-Ezee's selling power? You need only let people know the convenience of this drum and they will flock to your stations for oil in the Pour-Ezee Drum. Every sale moves 5 gallons of oil and creates a prospect for a 5-gallon refill. Mail the coupon for complete explanation of the plan, samples of the advertising material, and cost estimate.

St. Louis Can Company,
900 S. 14th St., St. Louis, Mo.

Please send us free samples of the items involved in this plan and a complete outline on how to handle it, and what it will cost.

We have.....company owned outlets and.....re-seller outfits.

Our distribution territory is.....

.....

(List counties and cities if less than state-wide distribution. If you know the number of automobiles registered in your territory, please give it.....

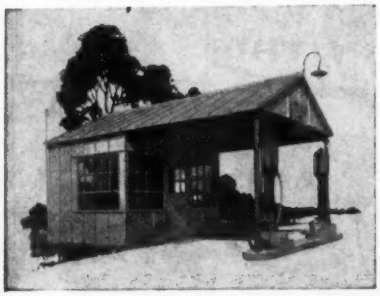
.....If not, we will furnish it.)

Name .....

Address .....

.....

St. Louis Can Company, St. Louis, Mo.



Artistic, Substantial Filling Stations

Made of galvanized steel. Patented interlocking joints make a weather-tight, strong building. Easily erected in a day. The only tools needed for erecting are hammer, pliers, and screwdriver.

Write for Catalog No. 7

Marion Machine, Foundry & Supply Co.
Box T 685, Marion, Ind.

ZERO COLD TEST GEAR LUBRICANT

A product of

TRADE MARK
REG. U.S. PAT. OFF.
FISKE'S

A highly developed—reasonably priced transmission and differential lubricant—operates easily with temperature BELOW ZERO—a dark plastic lubricant designed to meet general conditions of automotive transmissions—will not harden in cold weather—thoroughly coats gears and WILL NOT CHANNEL—this is the ideal all season lubricant—keeps its consistency in all temperatures.

Packed in 400, 200 and 100 lb. drums, also all size cans—200 and 400 lb. drums are equipped with special 2" opening to handle pump.

We manufacture a full line of Lubricating Greases and Specialties.

Wire us for samples and prices

FISKE BROTHERS REFINING CO.
24 State Street, New York, N. Y.
NEWARK, N. J. — *WORKS* — TOLEDO, OHIO

New Equipment

Southern Manganese Steel Co., St. Louis, Mo., expects to complete soon the installation of a new 500-pound electric melting furnace, which will be confined to the production of the smaller and lighter design castings in Fahralloy, its heat and corrosion-resisting alloy. This furnace will be an auxiliary to the 1½ ton electric melting furnace now in use for the same purpose.

* * *

Kellogg Mfg. Co., Rochester, N. Y., manufacturer of air compressors and oil heating equipment, announces the appointment of Louis Scheuerle, formerly district manager for New York and New England, as sales manager of the company.

Other changes announced by J. D. Boucher, vice president, are: H. F. Jones, formerly district manager in the southeast, now district manager for New England with headquarters at Boston; Charles A. Cole, district manager of southeast territory with headquarters at Atlanta, Ga.; and C. A. Clark, district manager of metropolitan New York, with headquarters at New York City.

* * *

General Refractories Co., Philadelphia, Pa., has developed Biasbrix, a unique-shaped brick which overlaps and ties together three other Biasbrix to form a tight joint and strong wall to prevent heat losses. The brick is laid up on the bias to give a natural self-locking construction, which reduces heat losses and slag penetration to the minimum, the company claims.

* * *

Globe Mfg. Co., Battle Creek, Mich., has off the press bulletin 271 giving complete information, prices and specifications on Globe air compressors, air stands, and on the new Simplex Hi-Pressure car washer. Equipment for paint spraying and other fittings and accessories are included.

* * *

Paul L. Slonaker, district manager for Louisiana and Arkansas for the Joseph Reid Gas Engine Co., Oil City, Pa., recently visited the Oil City plant. At the same time Oran Krug, of the Tulsa shop of the company, visited Oil City.

* * *

Erie Meter Systems, Inc., Erie, Pa., has appointed James W. Stuart sales representative for Columbus, O., territory.

ROLLA, Mo.—Rolla Oil Co., an Independent oil jobbing concern here, was recently sold to A. L. Harden of Springfield, Mo., who will conduct the business under the same name, according to H. C. Casselman, former owner of the Rolla company.

SAVE TIME LOADING

Heil Quality Steel Welded Truck Tanks are correct in every engineering detail. All parts, including the manhole and filler plugs, air vents, valves, expansion joints, pump units with power take-offs, are designed to enable the tanker to give faster and better service. The pump unit on the Heil tanker, pictured at left, could have been used to load the tank if greater speed than was obtained by the gravity method had been desired.

MAKE QUICK DELIVERIES

Heil Fuel Oil Tankers equipped with the Heil-Viking rotary pump unit will unload into any storage tank at the rate of from 90 to 100 gallons per minute. This speed is especially desirable when supplying office or residence storage tanks from crowded, busy streets. The speed also enables the tanker to carry more pay load, make more deliveries, each day. A relief valve which operates under 35 pounds pressure permits use of shut-off at end of hose.

HEIL Tankers Increase Fuel Oil Profits

Delivery costs wipe out the profit on fuel oil business for many distributors because they are trying to use old or improper equipment serving a new field. These same fellows, progressive in every other respect, wouldn't drive a horse and carriage down main street, but many are trying to serve the heating trade using tankers purchased five to fifteen years ago and intended to supply gasoline filling stations. It can't be done—at a profit. Specialized equipment is necessary and Heil has developed a fuel oil delivery unit to meet every need. Get started, today, toward lower delivery costs and bigger profits by writing The Heil Co. for Bulletin 176. *Use the coupon.*

1238-50 26th Avenue
Milwaukee, Wisconsin

THE HEIL CO.

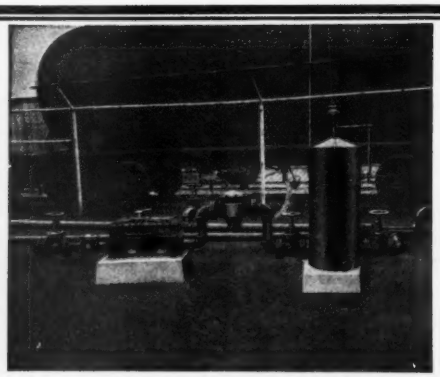
There Is No Substitute for Heil Quality

THE HEIL CO.,—1238-50 26th Ave., Milwaukee, Wis.

Please send my copy of your new Bulletin 176 explaining how Heil Tankers can Increase Fuel Oil Profits.

Print Name..... Firm Name.....

Street Address..... City and State.....



GRANBERG PETROLEUM METERS

give precise measurements of

Petroleum Products

Use them to check your TANK CAR receipts and you will be sure of the amount your station should be charged with.

Our Engineering Department is at your service.

Send For Our Literature

Associated Supply Company

Meter Department

79 New Montgomery St. **San Francisco, Calif.**

GULF Refining Company

General Sales Offices

PITTSBURGH, PA.

District Sales Offices

New York, Houston, Atlanta, Boston, New Orleans, Tampa, Philadelphia, Louisville

REFINERS OF OKLAHOMA TEXAS AND LOUISIANA

PETROLEUM

REFINED OIL
GASOLINE
NAPHTHA
GAS OILS
PARAFFINE WAX
PETROLEUM COKE

Fuel Oil--Lubricating Oils

CYLINDER ENGINE
CORDAGE

RED AND PALE PARAFFINE OILS

New Patents

Nov. 29

REFINING

Method and Apparatus for the Control of Temperature—Luis de Florez, Pomfret, Conn., assignor to The Texas Co., New York City. Filed Feb. 14, 1925. No. 1,650,887.

System of Regulation—Luis de Florez, Pomfret, Conn., assignor to The Texas Co., New York City. Filed Nov. 16, 1925. No. 1,650,889.

Process of Cracking Hydrocarbon Oil and Manufacturing Cyanides—John Collins Clancy, Asbury Park, N. J. Filed Dec. 28, 1925. No. 1,651,114.

Arrangement for Refining Heavy Mineral Oils—Lazer Edeleanu, Karl Pfeiffer, Karl Gress, and Paul Jodeck, Berlin, Germany. Filed Sept. 31, 1924, in Germany Sept. 19, 1923. No. 1,651,328.

PRODUCTION

Process of and Apparatus for Refining Petroleum and Oil-Field Emulsions—Louis E. Winkler and Fred C. Koch, Wichita, Kans. Filed Sept. 20, 1926. No. 1,650,813.

Recovery of Petroleum from Oil-Bearing Sands—Howard Atkinson, Charleston, W. Va., assignor to Howard Atkinson, Francis K. Holmestead and John B. Adams, Charleston, W. Va. Filed April 4, 1926. No. 1,651,311.

Combination Lifting and Lowering Tool for Drills—Oscar Martin Carter, Houston, Tex. Filed Dec. 27, 1926. No. 1,651,322.

MISCELLANEOUS

Portable Foam-Injection Spout—Tracy S. Park, Houston, Tex. Filed Dec. 7, 1926. No. 1,650,647.

Process of Producing Corrosion-Resisting Coating on Iron and Steel Products—Chad H. Humphries, Kokomo, Ind., assignor to Metals Protection Corp., Indianapolis, Ind. Filed June 5, 1924. No. 1,651,278.

Donnells Give Stadium To Findlay

FINDLAY, Dec. 10.—The new Donnell stadium here, gift of the Donnells of the Ohio Oil Co., is to be completed next year and presented to the Findlay Board of Education.

O. D. Donnell, president of the Ohio Oil Co., has arranged a football game in the stadium Oct. 6 between Case school at Cleveland and Ohio Northern university; Mr. Donnell was student manager of the Case football team in his under-graduate days.

The stadium is being built by heirs of the late J. C. Donnell, former president of the Ohio Oil Co. It adjoins the J. C. Donnell junior high school.

S. O. California Buys Tankers

LOS ANGELES, Dec. 8.—It was announced recently that the Standard Oil Co. of California had placed orders for two tankers to be delivered late in 1928. Each vessel will be 526 feet in length with 61 feet beam. They are to be twin-screw driven and to have twin Krupp-Diesel engines of 2,000 horsepower each. New pump systems and tank arrangements will permit loading and discharge in less time than the old methods.

Time-Proof! Weather-Proof!

- - the colors are "fused" into the glass faces of Cincinnati Globes

CINCINNATI Globes are everlasting because the colors are "fired in" at glass-melting heat — they are *ceramic* or glass colors — actually a part of the glass.

Your trade design, in full brilliant colors, remains the same for years — it cannot be dried out by the heat of the electric lamp, which is one of the causes of peeling, fading and cracking.

Cincinnati Globes are a *permanent* advertisement investment. They effectively sell your product right at the *exact point* of purchase.

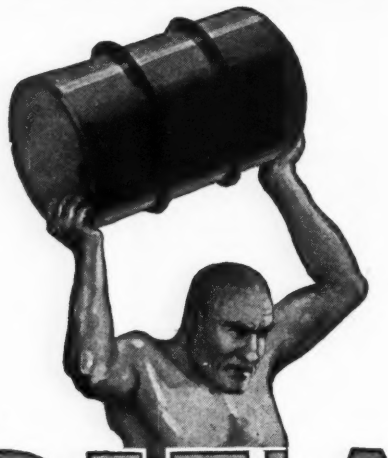
Your trade design can be reproduced in these everlasting Cincinnati Globes at very attractive prices. Write today for quotations. Prompt deliveries assured.

We maintain a complete Art Department for creating new trade designs — this service is at your disposal.

The Cincinnati Advertising Products Co.
Cincinnati, Ohio

CINCINNATI GLOBES

SELL MORE GASOLINE AND OILS



WHY?

"DEFIANCE"

—because the men in back of the Defiance Steel Barrel have pledged themselves to make the best barrel that it is possible to build.

—because there is a type of Defiance Steel Barrel to fit your every need.

—because you can get Defiance Steel Barrels when you want them, due to adequate production and storage facilities.

—because you always get your money's worth in a Defiance Steel Barrel.

Give them a trial and you will always use Defiance Steel Barrels.

The American Steel Package Co.
Defiance, Ohio

FORTY years successful experience; plant fully equipped for fabricating plate up to 1½" thick. Your specifications and inquiries are invited.

Pressure Stills for Cracking Process - Fractionating Towers - Dephlegmating Towers, Bubble Towers - Heat Exchangers - Agitators - Steam Stills - Crude Stills - Condenser Boxes, Run Down Tanks - Blending Tanks - Hemispherical Tanks - Blow Cases - Acid Tanks, Compounding Kettles - Storage Tanks to 80,000 Barrels - Smoke Stacks and Breechings, etc.

THE BIGGS BOILER WORKS CO., Buchtel and Bank Sts., Akron, O.; 300 Madison Av., New York

Auto Output Down 50% From Year Ago

NEW YORK, Dec. 10.—Automotive Industries this week said:

Although the Ford announcement has relieved widespread uncertainty in the automobile industry concerning the price of the new car, it is too soon to report the approximate effect on the market. Many dealers believe that it will be easier to sell cars now that the new Ford is an actuality rather than a phantom.

The current low state of production and sales can be judged from the preliminary figures on November business. Output last month was 24 per cent under the same month of 1926 for the companies exclusive of Ford and for the entire industry marked a drop of about 50 per cent. It is likely, however, that the December results will compare more favorably with last year, when there was a sharp year-end decline.

Walter Teagle Appointed Chemical Advisor

NEW YORK, Dec. 8.—Walter C. Teagle, president, Standard Oil Co. of New Jersey, with seven other men prominent in various branches of the chemical industries, has been asked by Secretary of Commerce Hoover to serve on the chemical advisory committee of the Department of Commerce. With these additional appointments, the membership of the original committee of eight has been doubled.

The committee was appointed to act as a connecting link between the chemical industries and the department. It will meet at the department Dec. 12 to discuss a number of problems with Secretary Hoover and Dr. Julius Klein, director of the Bureau of Foreign and Domestic Commerce.

Six bucks were killed on a deer hunt in the Chisos mountain country, late in November, by a party composed by members of the Prairie Oil & Gas Co.'s organization in Texas. Ed T. Cox, Sr., of the Prairie's land department at Eastland headed the party, which also included W. A. Yeager, district superintendent, and Richard C. Foley, chief engineer, of Midland; J. M. Armstrong, chief geologist in Texas, of Eastland; Ed T. Cox, Jr., Luther and Floyd Stafford and their nephew, "Buck" Williams of Eastland; and "Mac" MacLaren, Breckenridge district scout of Phillips Petroleum Co.

52 Weeks of Good Wishes

1. You — who read the "office copy" of National Petroleum News—treat yourself to "52 Weeks of Good Wishes" this coming year.

Have your own personal copy delivered at your home *each week.*

A "home copy" of National Petroleum News is a touch of luxury you will enjoy and profit from all during 1928.

2. You — who already enjoy the luxury of a "home copy"—remember your friends and associates in the oil business with "52 Weeks of Good Wishes." We will mail them a Christmas card from here signed with your name.

Thus, you dispose of your Christmas problem quickly and thoughtfully. Yes—profitably, for where can you get greater value for three dollars and a half than in fifty-two issues of NATIONAL PETROLEUM NEWS.

Send your order in *at once,* to avoid the usual holiday jam in the mails.

NATIONAL PETROLEUM NEWS,
701 Penton Bldg., Cleveland, O.

Send me "52 Weeks of Good Wishes" for which I enclose $3.50. (Foreign $5.)

NAME.....

St.-Box.....

City-State.....

Position.....

Send "52 Weeks of Good Wishes" *from me* to:

NAME.....

St.-Box.....

City-State.....

SIGN MY NAME:

.....

KANOTEX

A Christmas Message to Our Kanotex Family

The year just past has been a good one. During 1927, through the splendid co-operation of our jobbers and dealers, our progress has been most satisfactory, indeed. For this co-operation—and loyalty as well—we thank you all.

We have tried to give you the kind of co-operation that means more business and bigger profits for you. We hope our efforts have met with your approval.

Looking forward to 1928, it is our earnest desire to better our service to you, in every possible way. To this end we welcome your suggestions and criticisms. May we have them? Let's pull together to make 1928 an even bigger and better year than 1927!

Our best wishes to you for a very Merry Holiday Season, and a Prosperous 1928.

THE KANOTEX REFINING COMPANY

Phone L. D. No. 4,
Arkansas City, Kas.

No Time Wasted Making Change
ALLISON COUPON BOOKS
Accurate—Compact—Convenient

Your customers like the faster, more accurate service that Allison Coupon Books give. Simple, practical, always dependable. Furnished in stock or special designs. Send for samples and prices.

Allison Coupon Company
Ind'anapolis, Ind'ana
Coupon Book Specialists Since 1888

New Stations Building

Boston, Mass.—John M. McDonald and Frederick L. O'Neil will each build filling station.

Cannon Falls, Minn.—Penn-American Oil Co. will build filling station.

Baudette, Minn.—Dr. Doyle will build filling station.

Rochester, Minn.—William H. Kimball will erect filling station.

Chariton, Ia.—Marland Refining Co. is completing filling station.

Humboldt, Ia.—Marathon Oil Co. will build filling station.

Humboldt, Ia.—Andrew Christensen will erect filling station.

Mt. Vernon, Ia.—Robert Moffitt will build service station.

Kimball, Neb.—Farmers Paint & Oil Co. is building filling station.

Hammon, Okla.—The Texas Co. is completing filling station.

San Antonio, Tex.—William O. Reiden Bros., and Matilde Elizondo will build filling station each.

Grant City, Mo.—Standard Oil Co. of Indiana will build filling station.

Paris, Ky.—Louis T. Lilleston will build filling station.

Jefferson City, Mo.—Kemp Asel, proprietor of City Tire Co., will build filling station.

Frederick, Okla.—Marland Refining Co. is completing filling station.

Adair, Okla.—Robert Sibley is completing filling station.

Alice, Tex.—Charles Walker and Frank Cannon will build filling station.

Pleasant Plains, Ill.—John B. Mann is completing filling station, equipped with rest rooms, on route 125.

Louisville, Ky.—Stoll Oil Refining Co. is erecting service station at Shelbyville, Ky. in connection with its bulk station there.

Fordyce, Ark.—El-Ro Oil Co. is building filling station.

Freeport, Kan.—Williams Oil Co. is completing filling station.

Kansas City, Mo.—Skelly Oil Co. has bought site at Independence and Euclid Aves. for filling station.

Grand Saline, Tex.—S. O. Lindsey, agent for The Texas Co. will build filling station.

Little Rock, Ark.—Mrs. A. E. Townsend will build filling station.

Fort Smith, Ark.—J. C. Kendall and Tom Norris seek permit for filling station.

Whitewright, Tex.—W. C. Huffines, whose filling station and garage was recently destroyed by fire, will rebuild.

Stanwood, Ia.—A. D. Jones and R. F. Moffett will build filling station.

Napoleon, O.—Frank and Gaston Boyer will build filling station.

Galion, O.—Max Osman, of Shelby, O., is building filling station.

Corning, Ia.—J. A. Anderson is erecting filling station.

Grand Rapids, Mich.—Standard Oil Co. of Indiana will build filling station.

Beeville, Tex.—Mrs. Dugat will build filling station.

Corning, Ia.—People's Oil Co. will erect filling station.

Sioux City, Ia.—George Maule will build filling station.

Lexington, Tenn.—Lee Cogdell is building filling station.

Grant City, Mo.—Standard Oil Co. of Indiana will build filling station.

Hammon, Okla.—The Texas Co. will build filling station.

Wakefield, Mass.—A. H. Saunders will erect filling station.

Norwalk, Conn.—Five permits for filling stations are being sought here, one each by Albert L. McIntosh, Clarence E. Slauson, Hugh L. Jones and Earl L. Beers, Abe B. Cohen, and Ballardino Fahrizzo.

Monticello, Ind.—Sinclair Refining Co. is building filling station.

Weeping Water, Neb.—H. C. and Carl Meier are building filling station.

Ainsworth, Neb.—Ainsworth Oil Co. is building filling station.

Waterloo, Ia.—Roxana Petroleum Corp. has purchased property for filling station.

Geddes, S. D.—Standard Oil Co. of Indiana is completing filling station.

Rolla, Mo.—Pierce Oil Corp. will erect filling station.

Syracuse, Neb.—Mr. Hall, of Cook, Neb., purchased property for filling station.

Jefferson, Okla.—A. J. Batchelor is completing filling station.

St. Genevieve, Mo.—Leon Vorst will build filling station.

Jefferson City, Mo.—Roxana Petroleum Corp. will build service station.

Peabody, Kan.—Bryan Collins is completing filling station.

Chickasha, Okla.—Frank J. Siebert will build filling station.

Goose Creek, Tex.—Humble Oil & Refining Co. is building filling station.

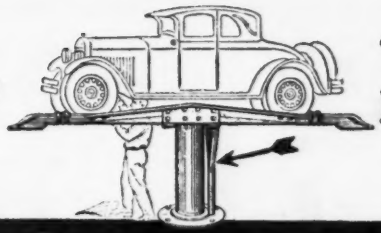
Eastern Marketer Establishes Fellowship

MIDDLETOWN, Conn., Dec. 10.—An industrial fellowship has been established in the department of chemistry of Wesleyan University by Meech & Stoddard, Inc., operators of the Red Wing Gas Co. of Middletown, to test the relative values of gasolines. Myron B. Diggin is the first holder of the fellowship. He will cooperate with Prof. C. R. Hoover, of the chemistry department, in research work on oils also.

The company is conducting a column of comment on timely topics in the Middletown Press as part of its advertising campaign. In this column are included items concerning the company's products and employes, as well as other items that appeal to popular taste.

Offices formerly maintained at Wichita Falls by the Danciger Oil & Refining Co., are being moved to Forth Worth, where they will be located in the W. T. Waggoner building. The Danciger brothers, Dan, Jack, A., and M. O., are widely known in the southwest, where they have been active in development and the purchase of royalties since Burkburnett days.

"Quick Service"



"Big Profits"

Safety Lift

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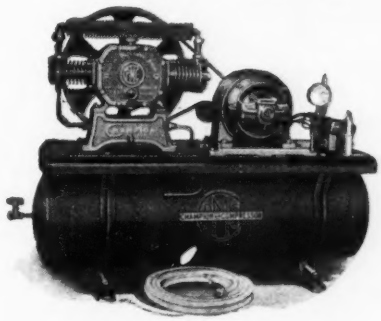
builds automatic compressors in both Single and Two-stage—and in many sizes and prices to fit every need.



Automatic Two Stage N-13 Equipment ¾ H. P. 32 Gal. Tank 200 lbs. Working Pressure

Most popular of our various equipments has sufficient capacity for the average service station, garage or tire shop.

Equipment includes: Compressor with fan fly-wheel, clear vision oil gauge, filtering trap, check valve, safety valve, air gauge, automatic electric controller, automatic pressure unloader, belt and automatic belt idler, motor with adjustable sliding motor rail, all mounted on metal base; tank, needle valve and 25 ft. air hose and chuck with fittings all complete.

Automatic Single Stage S-21 Equipment ½ H. P. 32 gal. Tank 150 lbs. Working Pressure

Equipment includes: Compressor with fan fly-wheel clear vision oil gauge, filtering trap, check valve, safety valve, air gauge, automatic electric controller, automatic pressure unloader, belt, motor with adjustable sliding motor rail, all mounted on metal base; tank, needle valve and 25 ft. air hose and chuck with fittings, all complete.

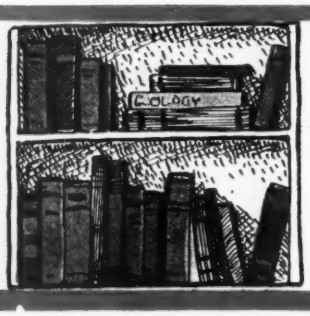
Champion also builds —

SERVICE TOWERS, four styles combining air, water, light. CAR WASHERS, two sizes covering every car washing need. PAINT SPRAY UNITS - two styles.

Right now write for the new Champion Catalog and prices.

Champion Pneumatic Machinery Co.

8168 So. Chicago Ave. Chicago, U. S. A.



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YOUR Christmas Greetings with a good book—is a thoughtful way of remembering your friends and associates at Christmas time.

We will enclose a Christmas card signed with your name. All you have to do is to send in the coupon.

If you don't find the book you wish below, write us at once. We have a complete list of the best books on the petroleum industry.

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ACCOUNTING for the PETROLEUM INDUSTRY

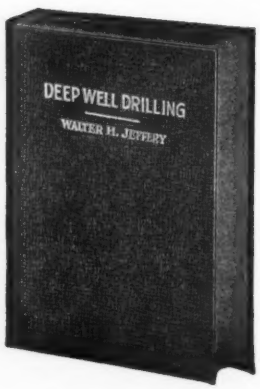
"Accounting for the Petroleum Industry" by D. F. Morland and R. W. McKee, is one of the most practical and comprehensive works on accounting principles and procedure for all branches of the oil industry—production, transportation and storage, refining, marketing.

Accounting for each branch is discussed separately; description of technical practices is given, and the accounting problem to be solved in each activity is set forth together with sample forms in use; tables for depreciation rates, etc.

For refinery accounting this book recommends the "weighted selling ratio method" which is described in detail and which has the advantage of determining for every product a cost which will allow for a reasonable profit when disposition is made thereof.

"Accounting for the Petroleum Industry" is carefully prepared and the most practical book written on the subject of accounting for the oil business.

304 pages—Price $4.



The second edition of "Deep Well Drilling" by Walter H. Jeffery is just out. The material in the first edition has been rewritten thruout with several new chapters on improvements in the art of drilling.

"Deep Well Drilling" discusses exhaustively cable tool drilling, rotary drilling, core drilling in all their phases; tells how to fish for lost tools; how to case, how to use packers, how to cement and how to shoot; how to plan operations intelligently; specify material, etc.

Every man engaged in the production of oil should have a copy. 648 pages, illustrated, price $6.00.

LUBRICATING OIL SALESMAN'S PRIMER

The "Lubricating Oil Salesman's Primer" is a new book by Claude Ettele, associated with one of the big oil companies in this country. The author's purpose is "to properly present a first view of the subject of lubrication and encourage the young salesman to study advanced works without which he will be unable to develop maximum efficiency in the services of his employers and of his customers."

The book takes up the manufacture of various lubricating oils and greases; tests by which oil and grease specifications are written; general discussion of lubrication problems in cylinders, turbines, internal combustion engines; power transmission machinery such as shafting; wire ropes; belts, gears, bearings, etc., driven machines such as air compressors, pneumatic tools, ice machinery, machine tools, textile machinery, paper mills, mine and quarry machinery.

"Lubricating Oil Salesman's Primer" also gives a standard line of lubricants, and specifies which oils or greases are applicable to the various kinds of machinery. This book is well worth its price of $3. Send for your copy today!

Cut out and mail

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Room 707, 1213 W. 3rd St., Cleveland, Ohio.

I want the books checked below. Enclosed is check or money order for $.....

- ☐ Accounting for the Petroleum Industry $4
- ☐ Deep Well Drilling $6
- ☐ Lubricating Oil Salesman's Primer $3

Or.....

SEND TO—

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.....

ON THE LAZY BENCH

National Petroleum News

The Oriental Aurora Blossoms

Fear that has gnawed at the very soul of many an American that the days of flowery oratory have gone forever has been allayed. Press bulletins from the recent American Mining Congress on a speech by Representative P. P. Campbell of Kansas bring a sparkling ray of hope. Quoting from Mr. Campbell's speech, on the hope that bureaucracy will give way to representative government: "The inauguration of such a day should be looked forward to with the hope of any early dawn rather than that we should stand trembling as the evening shadows of another Federal Bureau come on."

* * *

Story of a "Hard-luck" Oil Salesman

9:10—Looked over racing results.
9:16—Stopped to see show-window circus put on by lady advocating hair tonic.
10:05—Held curb-stone conference with old acquaintance.
10:37—Helped 1,000 other people watch messenger boy feeding pigeons.
11.00—Called on prospect. No luck.
11:02—Had measure taken for new pipe.
11:30—Phoned by favorite boyish bob. Closed big deal for Saturday night.
12:18—Went to see about new radio batteries.
12:45—Time out for lunch.
2:10—Joined excited posse watching man put on new tire.
2:31—Called on prospect. This fish is dead and buried from the eyebrows back.
2:33—Watched derrick lifting steel beam. Very educational.
3.12—Had argument with guy for stepping on my foot.
3:55—Called up prospect I forgot I had date with. No luck.
3.59—Joined class studying modern methods of moving safe.
4:15—Called on prospect. No luck.
4:17—Decided to cross street.
4:32—Bulletin. Landed safely!
4:41—Quit for the day. Lotta hard work. No luck.

Refiners Flash and Fire

* * *

Heat Value

"It is said that paper can be used effectively in keeping a person warm."

"Yes. I remember a 30-day note once kept me in a sweat for a month."

The Loreco Diamond

"Are you a clock watcher?" asked the employer.

"No, I don't like inside work", replied the applicant, "I'm a whistle listener."

Refiners Flash and Fire

* * *

Only Too True

Five gallons of gasoline had been put into the car. The owner drew a thirty-five cent cigar from his pocket, clipped off the end with a solid gold penknife, snapped a fifteen-dollar lighter for a flame, and asked, "How much?"

"Ninety-eight cents, sir," said the attendant.

"Ninety-eight cents?" echoed the owner, in obvious distress. "Ouch! You fellows in the oil business certainly ought to be rich."

Stepping into his five thousand dollar roadster, the customer pulled his ten-dollar straw hat more firmly down over his seventy-five cent hair-cut and drove off.

The Lamp

* * *

A chap was arrested for assault and battery and brought before the judge.

Judge (to prisoner): "What is your name, occupation, and what are you charged with?"

Prisoner: "My name is Sparks. I am an electrician, and I am charged with battery."

Judge (after recovering his equilibrium): "Officer, put this guy in a dry cell."

Skelly News.

* * *

Locating the Trouble

"Black chile, does you all know what deceit am?"

"Suttingly I does, Beelzebub."

"Den what is it?"

"Well, when I leans ovah an' heahs somethin' rip, I knows dat's de seat."

Pure Oil News

* * *

Wife—"Do you realize that twenty-five years ago today we became engaged?"

Absent-minded Prof.—"Twenty-five years! You should have reminded me before. It's certainly time we got married."

The Loreco Diamond

* * *

Great Consolation

"I never worry about my husband being in an accident when he doesn't get home on time."

"I must get mine to take out more insurance, too."

Pure Oil News

All-in-One-Folio

Your Name in Gold FREE

$25.00

Folio opens out to full Display

361—This Folio is substantially made from heavy, smooth, 5-oz. black cowhide. No flaps—Solid ends. Opens out for full display. Contains eighteen 4-oz. bottles with metal capped corks. Bottles partitioned separately. Case also contains six 1-oz. squat grease jars. Plenty of room for literature and order blanks.

Less 10% for Cash

Other styles in our FREE Catalog

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Builders of Sales Luggage

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Get a Binder

for

National Petroleum News

YOU can get one specially made to hold 26 issues of National Petroleum News—made of imitation leather and inexpensive.

It enables you to keep the weekly issues of National Petroleum News in good order and easily accessible.

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NATIONAL PETROLEUM NEWS

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Address.....

This Sign brings the motorist in!

and the Sinclair method of recommending Opaline brings him back!

Authorized Dealer

SINCLAIR OPALINE
REG. U.S. PAT. OFF.
MOTOR OIL

Seals Power at every Degree of Wear

DISPLAY this sign outside your station—you tell your motoring world that you sell not just oil but *CORRECT LUBRICATION!* If you are an Authorized Opaline Dealer, you will ask a motorist to look at his speedometer and tell you how many miles his car has been driven, then you will consult the Sinclair Recommendation Index, and give him the right grade of Opaline to fit the degree of wear in his engine and seal its power!

That is the Sinclair Law of Lubrication in operation. That's the commonsense method of correct lubrication which brings the motorist in—and brings him back. Let us tell you how we co-operate with Authorized Opaline Dealers in building profitable business.

SINCLAIR REFINING COMPANY, INC.
Also Makers of Sinclair Gasoline and H-C Gasoline
45 NASSAU STREET, NEW YORK
Atlanta Boston Chicago Houston Kansas City

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Refinery - Tank Wagon Markets

National Petroleum News

Exporters Continue Gasoline Purchases In Both North Texas and Oklahoma

Staff Special
TULSA, Dec. 10

THE Mid-Continent refinery market this week drifted toward the quietness that usually obtains before and through the holiday season. Salesmanagers expressed a desire to get as many orders on their books as possible by the middle of the month, knowing from past experience there would be little activity from then on until just before Jan. 1.

Exporters continued, however, to furnish the trade with its major interest. Approximately 750,000 gallons of 64-66, 390 end point gasolines were bought from north Texas refiners early in the week at 6.625 cents a gallon. At least three refiners got orders under this purchase.

Offers were out, meanwhile, for 64-66, 375 e.p. gasoline at 6.75 cents a gallon, but buyers apparently were having some difficulty in getting the goods. Late in the week one exporter raised his bid in north Texas to 6.875 cents a gallon, and was understood to have closed a deal for a small quantity late Friday. His offer at 6.875 cents was still open, it was said, just before the close of business today.

North Texas refiners are sold up on gasoline until around Jan. 15, and are unwilling to commit themselves for shipments after that date on the present market range. They believe that with foreign buyers still interested in the market, and with stocks at Gulf terminals relatively low there is a possibility prices will advance. Reports from the east indicate sellers already have advanced future quotations approximately 0.25 cent a gallon over quotations for goods now being lifted from Gulf ports.

Exporters also inquired for gasoline in Oklahoma this week and one sale of 2,000,000 gallons reported. The goods sold had a gravity of 60-64 and an end point of 375, the price being around 6.625 cents a gallon.

Domestic gasoline business as a whole has been comparatively steady.

With prices of natural gasolines under prices of U. S. Motor gasoline, there has been larger demand for naphthas for blending into motor fuel. Naphtha prices have increased. Few refiners in Oklahoma are making ordinary naphthas. Although prices have been as low as 5.625 cents for low gravity goods, virtually all quotations today were 6 cents a gallon, with spot goods relatively scarce.

The U. S. Motor gasoline prices have been steady. Most sales of 58-60 gravity goods were at 6 to 6.125 cents a gallon, although some sales were made to resale agents at fractionally lower prices. Competition from other areas continued to play an important part in retarding orders, although the cold wave this weak undoubtedly had its effect on consumption in the middle west.

Higher gravity gasolines continued in good demand, many refiners reported, but prices were generally unchanged from prices a week ago. The export buying in Oklahoma has taken the slack out of export grades sufficiently to prevent any price recessions even in the face of lower natural gasoline prices.

All grades of natural gasolines lost ground. Grade C set the pace. Two or three manufacturers early in the week had considerable amounts of Grade C loaded and no place to move the cars. Quotations as low as 4 cents accordingly were sent for over December shipment. Late in the week, however, reports were they had been able to move a sufficient quantity to relieve the pressure for the time being. Grade AA and Grade C lost approximately 0.25 cent this week, and grades B and BB lost a full 0.25 cent.

ONE or two larger manufacturers reported spot business was dull but contract business was excellent. Many of their customers, they said, had ordered out the maximum under their contract arrangement. One large company reported being completely sold up for this month, and may have to buy some goods on the outside before Jan. 1.

Exporters have had an offer out for kerosene in north Texas for several days. The price is 4.25 cents a gallon for 40-42 prime white goods, but as far as can be learned no purchases have been made. An inquiry also has been reported in Oklahoma at the same price, f.o.b. north Texas, which would be approximately 4.15 cents a gallon, f.o.b. Oklahoma plants.

A large refining company in Texas late in the week bought some 41-43 water white kerosene in north Texas at a price reported around 4.50 cents a gallon. Domestic business otherwise has been comparatively quiet in most of the Mid-Continent. Oklahoma refiners have had a little more difficulty in moving goods, but the Louisiana and Arkansas refiners, because of the comparatively small volume of kerosene made in those two centers, have been able to obtain more for their goods than the usual freight differential under Group 3.

REFINERS were anticipating a pick-up in stove distillate demand by Dec. 15. Refiners know consumption of home heating oils in the middle west will show a substantial increase because of two cold waves in one week.

Prices of 38-40 straw distillate in Oklahoma remained pegged at 3.25 to 3.375 cents. One or two refiners reported late in the week they had had offers from resale agents at 3.25 cents a gallon.

Gas oils were slightly cheaper today than a week ago, although the zero cold test goods are still in good demand. Ordinary dark 32-36 gas oil was moving at 2.375 to 2.50 cents in Oklahoma, with little indication prices would be much if any better until refiners begin to operate their cracking processes on a larger scale. Considerably more gas oil is in storage than the domestic trade, exclusive of refiners, apparently can absorb.

Fuel oils have been moving at 70 cents a barrel and up, both for spot and over December shipment. Oklahoma refiners have encountered considerable competition on fuel oils from other areas this month. Whereas Oklahoma refiners are asking $1.05 to $1.10 for 28-30 gravity zero cold test fuel oil, goods have been moved in the Chicago area at 97.5 cents a barrel. A few Oklahoma refiners

THE GUILD

cream of the crude
REG. U.S. PAT. OFF.

With all of the finesse that the famous watchmakers guilds applied to the great clocks that they put in the famous cathedral towers of Europe—the same that they put into the tiniest of watches—this same "Guild Spirit" lives in the quality achieved in INDEPENDENT BRIGHT STOCKS.

SPECIFICATIONS

Standard "D" Bright Stock

Gravity	23—25
Flash	530—540
Fire	600—610
Cold	15—20
Viscosity @ 210–150–160	
Emulsion O. K.	
Color	$1\frac{3}{16}$ to $1\frac{1}{4}$ T. R.
Carbon Residue Below 2%	

INDEPENDENT *Bright Stock*

A quality Product held rigidly to our standard specifications

SPECIAL

We are also producing a complete line of lubricating oils. Samples and specifications will be sent upon request.

INDEPENDENT OIL AND GAS COMPANY

PRODUCERS AND REFINERS
KENNEDY BUILDING
TULSA, OKLA. U. S. A.

CABLE ADDRESS: "INDOL"

Refinery Markets on Light Oils and Lubricants

Prices given below are in cents per gallon, F. O. B. refinery, except where $ is shown

(These Refinery Prices compiled in the OIL PRICE HANDBOOK for a whole year)

GASOLINE AND NAPHTHA

PENNSYLVANIA	Prices Dec. 12	Prices Dec. 5	Prices Nov. 28
52-54 Naphtha	8.00 – 8.25	8.00 – 8.50	8.00 – 8.50
54-56 Naphtha	8.25 – 8.50	8.25 – 8.50	8.25 – 8.50
58-60 Gasoline	8.25 – 8.50	8.25 – 8.50	8.25 – 8.50
60-62 Str.-run gasoline	8.50 – 9.00	8.50 – 9.00	8.50 – 9.00
64-66 Str.-run gasoline	9.25 – 9.75	9.25 – 9.75	9.25 – 9.75
68-70 Str.-run gas. 350-360 e.p.	10.00 –10.25	10.00 –10.25	10.00 –10.25
OKLAHOMA			
48-50 450 e.p. naphtha	†5.875– 6.00	5.625– 5.875	5.625– 5.875
50-52 450 e.p. naphtha	†5.875– 6.00	5.625– 5.875	5.625– 5.875
56-58 450 e.p. gasoline	6.00	6.00	6.00
58-60 450 e.p. gasoline	6.00	6.00	6.00
56-58 U. S. Motor, 437 e.p.	††6.00	††6.00	††6.125
58-60 U. S. Motor, 437 e.p.	6.00 – 6.125	6.00 – 6.125	6.00 – 6.125
60-62 437 e.p. gasoline	6.125– 6.375	**6.125– 6.375	**6.125– 6.375
60-62 400 e.p. gasoline	6.375– 6.625	**6.375– 6.625	**6.375– 6.625
64-66 390 e.p. gasoline	6.75	**6.75	**6.75
64-66 375 e.p. gasoline	7.00 – 7.125	**7.00 – 7.125	**7.00 – 7.125
68-70 350-360 e.p. gasoline	7.00 – 7.25	7.125– 7.25	7.00 – 7.25
KANSAS (F. O. B. refinery Kansas destination)			
58-60 U. S. Motor 437 e.p.	6.25 – 6.375	6.25 – 6.375	6.25 – 6.375
60-62 400 e.p. gasoline	6.75 – 7.00	6.75 – 7.00	6.75 – 7.00
64-66 375 e.p. gasoline	7.375– 7.50	7.375– 7.50	7.375– 7.50
NORTH TEXAS			
48-52 450 e.p. naphtha	†6.00	†6.00	†6.00
56-58 450 e.p. gasoline	5.875	5.875	5.875
58-60 450 e.p. gasoline	5.875	5.875	5.875
58-60 U. S. Motor 437 e.p.	6.00	6.00	6.00
60-62 400 e.p. gasoline	6.375	6.375	6.375
64-66 390 e.p. gasoline	6.625– 6.75	6.625	6.625
64-66 375 e.p. gasoline	6.875– 7.00	6.875	6.875
68-70 350-360 e.p. gasoline	7.125	7.00 – 7.125	7.00 – 7.125
NORTH LOUISIANA (For Louisiana and differential territory destination)			
58-60 U. S. Motor gasoline	6.50	6.50	6.50
ARKANSAS (For Arkansas intrastate shipment)			
56-58 450 e.p. gasoline	6.25	6.25	6.25
58-60 450 e.p. gasoline	6.25	6.25	6.25
58-60 U. S. Motor 437 e.p.	6.50	6.50	6.50
ARKANSAS (F. O. B. Arkansas refineries for interstate shipment)			
58-60 U. S. Motor 437 e.p.	**6.375	**6.375	**6.375
CALIFORNIA			
*54-58 U.S. Motor 437 e.p.	7.00 – 8.00	7.00 – 8.00	7.00 – 8.50
*58-61 U.S. Motor 437 e.p.	7.50 – 9.00	7.50 – 9.00	7.50 – 9.50
*42-45 Eng. dis. 445-480 e.p.	6.50 – 7.00	6.50 – 7.00	6.50 – 7.00

*2c tax to be added if used in state.

NATURAL GASOLINE

(Note: End point of all grades, not over 375° F. Since Oct. 1, 1927 all naturals must pass corrosion test.)

OKLAHOMA			
Grade AA, 80-87.9, 90% Recovery	†5.125– 5.25	†5.375– 5.50	†5.625
Grade A, 72-79.9, 90% Recovery	†5.375– 5.50	†5.625	†5.75 – 5.875
Grade BB, 84-92, 85% Recovery	†4.50	†5.00	5.25
Grade B, 76-83.9, 85% Recovery	†4.50	†5.00	5.25
Grade C, 80-92, 78% Recovery	†4.125	4.50	4.875– 5.00
NORTH TEXAS (F. O. B. Breckenridge)			
Grade AA, 80-87.9, 90% Recovery	†5.125– 5.25	†5.375– 5.50	†5.625
Grade A, 72-79.9, 90% Recovery	†5.375– 5.50	†5.625	†5.875– 6.00
Grade BB, 84-92, 85% Recovery	†4.50	†5.00	5.25
Grade B, 76-83.9, 85% Recovery	†4.50	†5.00	5.25
Grade C, 80-92, 78% Recovery	†4.125	†4.50	5.00
NORTH LOUISIANA (F. O. B. Monroe District)			
Grade AA	†5.75	†5.75	†6.375
Grade BB	†5.50	†5.50	† 6.00
Grade C	†5.25	†5.25	†5.625– 5.75
CALIFORNIA			
75-85, 375-390 e.p. blend	9.00 –10.00	9.00 –10.00	9.50 –10.00

MOTOR FUEL BLENDS

PENNSYLVANIA			
68-70 Blend 437 e.p.	Prices	.....	.....
64-66 Blend 437 e.p.	temporarily	.....	.....
60-62 Blend 437 e.p.	discontinued	.....	.....
OKLAHOMA			
64-66 Blend 437 e.p.	**6.00	5.875– 6.00	6.00

BURNING OILS

PENNSYLVANIA			
45 w.w. kerosene	6.50 – 6.75	6.50 – 6.75	6.50 – 6.75
46 w.w. kerosene	6.875– 7.25	6.875– 7.25	6.875– 7.25
47 w.w. kerosene	7.25 – 7.50	7.25 – 7.50	7.25 – 7.50
OKLAHOMA			
41-43 w.w. kerosene	4.50 – 4.625	4.50 – 4.625	4.50 – 4.625
42-44 w.w. kerosene	4.875– 5.00	5.00	5.00 – 5.25
KANSAS (F. O. B. refinery Kansas destination)			
41-43 w.w. kerosene	4.75 – 5.25	4.875– 5.25	4.875– 5.25
42-44 w.w. kerosene	5.625– 5.75	5.625– 5.75	5.625– 5.75
NORTH TEXAS			
40-42 w.w. kerosene	†4.25	†4.25	†4.50
41-43 w.w. kerosene	†4.375– 4.50	†4.375– 4.50	†4.625– 4.75
NORTH LOUISIANA (For Louisiana and differential territory destination)			
41-43 w.w. kerosene	5.00 – 5.25	5.00 – 5.25	5.00 – 5.25
ARKANSAS (For intrastate shipment only)			
42-44 kerosene	5.25	5.25	5.125– 5.25
ARKANSAS (F. O. B. Arkansas refineries for interstate shipment)			
42-44 kerosene	5.00	5.00	5.00
CALIFORNIA			
38-40 w.w. kerosene	5.00 – 5.50	5.00 – 5.50	5.00 – 5.50

NEUTRAL OIL

PENNSYLVANIA Vis.	(Viscosity at 70°F.)		
200 No. 3 Assoc. Filt.	32.00 –33.50	32.00 –34.00	32.00 –34.00
180 No. 3 Assoc. Filt.	29.00 –31.00	29.00 –31.00	29.00 –31.00
150 No. 3 Assoc. Filt.	26.25 –28.00	26.25 –28.00	26.25 –28.00
	(Non Viscous)		
34 Grav. 330-340 Flash	7.25 – 7.75	7.25 – 7.75	7.25 – 7.75
36 Min. Neut. 300-305 Flash	6.50 – 7.00	6.50 – 7.00	6.50 – 7.00
**OKLAHOMA Vis. Color	(Viscosity at 100°F.)		
100—No. 2	6.00 – 6.50	6.00 – 6.50	6.00 – 6.50
150—No. 3	8.00 – 8.50	8.00 – 8.50	8.00 – 8.50
150—No. 4	8.00 – 8.50	8.00 – 8.50	8.00 – 8.50
180—No. 3	9.00 –10.00	9.00 –10.00	9.00 –10.00
180—No. 4	9.50 – 9.75	9.50 – 9.75	9.50 – 9.75
180—No. 5	9.25 – 9.75	9.25 – 9.75	9.25 – 9.75
200—No. 3	9.50 –11.00	9.50 –11.00	9.50 –11.00
200—No. 4	9.50 –10.75	9.50 –10.75	9.50 –10.75
200—No. 5	8.50 –10.50	8.50 –10.50	8.50 –10.50
220—No. 3	12.50 –13.50	12.50 –13.50	12.50 –13.50
220—No. 4	12.25 –12.50	12.25 –12.50	12.25 –12.50
220—No. 5	11.50 –12.00	11.50 –12.00	11.50 –12.00
240—No. 3	14.00	14.00	14.00
240—No. 4	13.25 –13.50	13.25 –13.50	13.25 –13.50
240—No. 5	12.00 –13.00	12.00 –13.00	12.00 –13.00
280—No. 3	15.50 –16.50	15.50 –16.50	15.50 –16.50
280—No. 4	15.25	15.25	15.25
280—No. 5	14.00 –15.00	14.00 –15.00	14.00 –15.00
300—No. 5-6	17.00	17.00	17.00
**GULF COASTAL Vis. Color	(Viscosity at 100° F., pour test 0)		
100—No. 2 Unfilt. Pale	6.50 – 7.00	6.50 – 7.00	6.50 – 7.00
200—No. 3 Unfilt. Pale	9.00 – 9.50	9.00 – 9.50	9.00 – 9.50
300—No. 3 Unfilt. Pale	10.00 –10.50	10.00 –10.50	10.00 –10.50
500—No. 3½ Unfilt. Pale	12.00 –12.50	12.00 –12.50	12.00 –12.50
750—No. 4 Unfilt. Pale	14.00 –14.50	14.00 –14.50	14.00 –14.50
200—No. 5½ Red Oil	7.50 – 8.00	7.50 – 8.00	7.50 – 8.00
300—No. 5½ Red Oil	8.50 – 9.00	8.50 – 9.00	8.50 – 9.00
500—No. 6 Red Oil	10.00 –10.50	10.00 –10.50	10.00 –10.50
750—No. 6 Red Oil	12.50 –13.00	12.50 –13.00	12.50 –13.00
**CALIFORNIA Vis. Color	(Viscosity at 100°F.)		
100—No. 2	9.00 – 9.50	9.00 – 9.50	9.00 – 9.50
100—No. 3	7.50 – 8.00	7.50 – 8.00	7.50 – 8.00
200—No. 3	9.50 –10.00	9.50 –10.00	9.50 –10.00
300—No. 3	10.50 –11.00	10.50 –11.00	10.50 –11.00
450—No. 3-3½	13.00 –13.50	13.00 –13.50	13.00 –13.50
550—No. 3-3½	14.50 –15.00	14.50 –15.00	14.50 –15.00
600—No. 3-3½	15.00 –15.50	15.00 –15.50	15.00 –15.50
100—No. 5	6.50	6.50	6.50
200—No. 5	8.00 – 8.50	8.00 – 8.50	8.00 – 8.50
300—No. 5	9.00 – 9.50	9.00 – 9.50	9.00 – 9.50
400—No. 5	11.00 –11.50	11.00 –11.50	11.00 –11.50
500—No. 5	11.00 –11.50	11.00 –11.50	11.00 –11.50
600—No. 5	12.00 –12.50	12.00 –12.50	12.00 –12.50
700—No. 7	14.00 –14.50	14.00 –14.50	14.00 –14.50

CYLINDER STOCKS

**OKLAHOMA			
190-200 Vis. at 210° Brt. St.	31.00 –32.00	31.00 –32.00	31.00 –32.00
150-160 Vis. at 210° Brt. St.	23.00 –26.00	23.00 –26.00	23.00 –26.00
600 E St. 140-150 Vis.-210°	17.00 –18.00	17.00 –18.00	17.00 –18.00
600 St. Ref. Olive Green	9.00 –10.00	9.00 –10.00	9.00 –10.00
600 St. Ref. Dark Green	7.00 – 8.00	7.00 – 8.00	7.00 – 8.00
Black Oil	5.00	5.00	5.00
PENNSYLVANIA	(1-inch Immersion Test)		
600 Steam Refined	9.50 –10.25	9.75 –10.50	9.75 –10.50
650 Steam Refined	11.00 –13.00	12.00 –13.00	12.00 –13.00
600 Flash	16.00 –16.50	15.00 –16.50	15.00 –16.50
625 Flash	27.00 –28.00	27.00 –28.00	27.00 –28.00
600 Warren E	17.00 –19.00	17.00 –19.00	17.00 –19.00
600 Oil City E	15.50 –16.50	15.50 –16.50	15.75 –16.50
600 D Filtered	24.50 –25.50	24.50 –25.50	24.50 –25.50
Cold Test Stock. 40-50 p. p., 140-150 vis. at 210°, 540-550 flash, No. 8 color	29.50 –31.00	29.50 –30.00	29.50 –30.50
40-50 p.p., 140-150 vis. at 210, 540-550 flash, No. 6-6½ color diluted	27.50 –29.00	28.00 –29.00	27.50 –28.50

(Note—Prices of total immersion test goods average 1 to 3 cents per gallon higher)

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CLEANS —at a lower cost

IT costs less—in time, labor, and material—to clean the Oakite way!

Oakite cleaning materials are the most powerful known. They remove dirt, grease, oil, asphaltum and paraffin deposits quickly, effectively, safely. Working conditions are improved.

Tell us your problem. Write for booklet or have one of our service men call. No obligation.

Oakite Service Men, cleaning specialists, are located in the leading industrial centers of the U. S. and Canada.

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Industrial Cleaning Materials and Methods

Get Ready For Spring. Order Now

The Sign Which Says "Buy Gas Here"

This Western curb Service Station sign should form a very important link in your advertising chain. Through your ads you tell them WHY to buy and with this sign you tell them WHERE to buy—a very vital matter if your advertising is to be effective.

These signs are 52 inches high by 29½ inches wide and are of heavy substantial construction. They are cast from gray iron and the base counterbalances the most severe wind storms.

We are prepared to render complete service. Art work and designing the sign, supplying the sign itself or furnishing you the frame for your own sign.

The most attention attracting and sales compelling sign on the market. The sign which says: "Buy Gas Here."

Write for prices and full information

The Western Iron & Foundry Co.
Wichita, Kansas

REPUTATION GUARANTEE SATISFACTION

On good roads or bad roads, loaded or light, Brown tanks will remain tight. No secret reinforcements nor mysterious highsounding features. Just good honest full weight material correctly built by real tradesmen. The Brown Certified Truck Tank is the result of practical oil men's experience. From the oil man's standpoint, we offer just what you expect—efficient service—oil-tight at all times—and attractive appearance—priced right. Get our figures and compare the facts.

A 1650 gallon with stake barrel carriers and underslung canboxes

BROWN SHEET IRON & STEEL CO. **ST. PAUL, MINN.**

Tear out this Coupon and mail it today

Make of Truck..... Size Tank Required.....

Other equipment on which you may send prices.....

Name..... Address.....

Refinery Markets on Wax and Heavy Oil Products

Prices given below are in cents per gallon, F. O. B. refinery, except where $ is shown
(For quick reference to Refinery Prices, get the OIL PRICE HANDBOOK, published annually)

WAX

PENNSYLVANIA	Prices Dec. 12	Prices Dec. 5	Prices Nov. 28
Per Pound, New York			
122-124 white crude scale	2.75 – 3.00	2.75 – 3.00	2.75 – 3.00
124-126 white crude scale	3.00	3.00	3.00
OKLAHOMA			
**124-126 Semi-refined..	2.375– 2.625	2.50 – 2.75	2.50 – 2.75
CALIFORNIA			
White crude scale, per pound, ton lots.....	6.00 – 6.50	6.00 – 6.50	6.00 – 6.50

FUEL OIL

PENNSYLVANIA			
36-40 fuel oil.....	4.50 – 4.75	4.50 – 4.75	4.50 – 4.75
30-34 fuel oil.....	4.625– 4.75	4.625– 4.75	4.625– 4.75
28-32 fuel oil.....	4.625– 4.75	4.625– 4.75	4.625– 4.75
OKLAHOMA			
38-40 straw distillate.....	3.25 – 3.375	3.25 – 3.375	3.25 – 3.375
36-38 straw distillate.....	3.00	3.00	3.00
*32-36 gas oil, straw.....	†2.50	†2.625	†2.625
*32-36 dark gas oil.....	2.375– 2.50	2.50 – 2.625	2.50 – 2.625
28-30 fuel oil (in bbls.)...	$0.925– 0.975	$0.925– 0.975	$0.925– 0.975
26-28 fuel oil (in bbls.)...	$0.875– 0.90	$0.875– 0.90	$0.875– 0.90
24-26 fuel oil (in bbls.)...	**$0.80– 0.825	**$0.80– 0.825	**$0.80– 0.825
22-26 fuel oil (in bbls.)...	**$0.75– 0.775	**$0.75– 0.775	**$0.775
18-22 fuel oil (in bbls.)...	**$0.70– 0.725	**$0.725	**$0.725
16-18 fuel oil (in bbls.)...	**$0.70	**$0.70	**$0.70– 0.725
14-16 fuel oil (in bbls.)...	**$0.70	**$0.70	**$0.70– 0.725

*Zero cold test low flash goods sell for ⅛ to ¼ cent more per gallon.
Zero cold test fuel oils sell for 5 to 15 cents more per bbl.

KANSAS (F. O. B. refinery Kansas destination.)			
38-40 straw distillate.....	3.50 – 3.75	3.50 – 3.75	3.50 – 3.75
36-38 straw distillate.....	3.25	3.25	3.25
32-36 gas oil.....	2.75 – 2.875	2.75 – 2.875	2.75 – 2.875
24-26 fuel oil	*$0.90 – 0.95	*$0.90 – 0.95	*$0.90 – 0.95
18-22 fuel oil.....	*$0.85	*$0.85	*$0.85
NORTH TEXAS			
38-40 straw distillate.....	3.00 – 3.25	3.00 – 3.25	3.125– 3.25
32-36 gas oil, cracked....	2.25 – 2.375	2.375– 2.50	2.375– 2.50
32-36 gas oil, uncracked..	2.375	2.50	2.50
24-26 fuel oil (in bbls.)...	$0.75 – $0.80	$0.775–$0.80	$0.80

GULF COASTAL	Prices Dec. 12	Prices Dec. 5	Prices Nov. 28
Fuel (in bbls.).....	$1.50 – 1.55	$1.50–$1.55	$1.50 –$1.55
Gas oil.....	4.375– 4.50	4.375–4.50	4.375– 4.50
NORTH LOUISIANA (For Louisiana and differential territory destination)			
32-36 gas oil, dark.....	3.00 – 3.125	3.00 – 3.125	3.00 – 3.125
32-36 gas oil, straw.....	3.125– 3.25	3.125– 3.25	3.125– 3.25
16-20 fuel oil (in bbls.) ...	$1.00	$1.00	$1.00
ARKANSAS (For Arkansas intrastate shipment only)			
32-36 gas oil.....	3.00	3.25 – 3.50	.....
28-32 gas oil	2.75 – 3.00	3.00	3.00
32-36 straw gas oil.....	3.25 – 3.50	2.75 – 3.00	2.75 – 3.00
ARKANSAS (F. O. B. Arkansas refineries for interstate shipment)			
28-32 gas oil.....	2.75	2.75	2.75
Smackover crude fuel....	$0.975– 1.00	$0.975– 1.00	$0.975– 1.05
CALIFORNIA (F. O. B. San Joaquin Valley. At San Francisco, 4c per bbl. more)			
14-18 fuel oil (in bbls.)...	$0.60 –$0.75	$0.60 –$0.75	$0.60 –$0.75
14-18 Bunker oil (in bbls.)	$0.80 –$1.00	$0.85 –$1.00	$0.85 –$1.00
30-34 gas oil (in bbls.)...	$1.05 –$1.10	$1.05 –$1.10	$1.00 –$1.05
27 Plus Diesel oil (in bbls.)	$0.85 –$1.00	$0.85 –$1.00	$0.85 –$1.00

PETROLATUMS

PENNSYLVANIA (In cents per pound in tank cars; in barrels, in car lots ¾c per pound more.)			
Snow White.....	9.25	9.25	9.25
Lily White.....	8.25	8.25	8.25
Cream White.....	7.25	7.25	7.25
Light Amber.....	5.50	5.50	5.50
Amber.....	4.50	4.50	4.50
Red.....	3.75	3.75	3.75
Green No. 5 color.....	3.50	3.50	3.50

**PETROLEUM COKE

(Per ton in car lots)			
Lump.....	$5	$5	$5
Still run.....	$3	$3	$3
Breeze.....	$2	$2	$2

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have been contracting to sell some of their output over December at less than spot prices, and attempting to move the remainder of their production on the spot market at slightly higher prices than their contracts will net them.

North Texas refiners are seeing their fuel oil stocks steadily pile up with no place to move the goods. Natural gas has made tremendous inroads in Texas, especially among the industries, and the railroads cannot possibly take up the slack the gas consuming industries have made. Many refiners in north Texas have put in gas burners. A few have both gas and oil burners and use whichever fuel is cheaper.

One large refiner in north Texas, however, has found he can make a little profit cracking 24-26 fuel oil when he can buy it at 77.5 cents a barrel plus a small switching charge. He is giving the market some support.

Fuel oil stocks at refiners that report weekly operating statistics to NATIONAL PETROLEUM NEWS, were 101,000,000 gallons a year ago, and 103,000,000 gallons this year. Although there was an increase of 2,000,000 gallons in the field, stocks on hand in the north and central Texas area were almost three times larger Dec. 1 this year than Dec. 1, 1926.

Oklahoma refiners a year ago held 67,000,000 gallons of fuel oil in storage and hold 42,000,000 gallons now. Kansas refiners have approximately 3,000,000 gallons more in storage this year than last. Louisiana-Arkansas refiners have about 200,000 gallons less than a year ago.

Oklahoma wax prices moved down 0.125 cent this week. Inquiries were not so numerous. Lower prices in the east are blamed for slowing business here.

Sign Consumer Contracts On K. C. Gas Line

TULSA, Dec. 9.—Consumer contracts are being signed in Kansas City with the Kansas City-Texas Gas Co., which proposes to build a 24-inch gas line from the Panhandle of Texas to Kansas City. It is understood that the consumer contracts already signed represent a large part of the proposed line's capacity.

The company is headed by John L. Knorpp, of Los Angeles. The banking houses of Hemphill, Noyes & Co. and Peabody, Smith & Co., New York, will handle the financing of the line, which will be largely in the form of bonds.

Ralph E. Davis, consulting engineer and geologist, of Pittsburgh, Shreveport, Tulsa and Charleston, W. Va., has become chief consulting engineer of the Kansas City-Texas Gas Co.

The company has industrial gas franchises in Kansas City, Kans., and Kansas City, Mo. The rates are based upon quantity, starting with a low of 17 cents.

LOS ANGELES, Dec. 9.—During November petroleum shipments out of Los Angeles harbor to points outside Pacific coast trade territory totaled 5,394,455 barrels or daily average of 179,828 barrels.

Of the total movement, Atlantic domestic points drew 764,101 barrels of crude, 180,154 barrels of fuel, 728,670 barrels of gasoline, 92,427 barrels of kerosene and 71,632 of tops. Shipments to Atlantic foreign included 856,533 barrels of fuel, 522,356 barrels of gasoline and 27,359 barrels of Diesel. Balance went to Pacific foreign points.

PITTSBURGH, Dec. 10.—Col. G. A. Burrell, chemical engineer here, has been appointed to the chemical committee of the American Gas Association.

Cold Weather Stimulates Demand For Zero Burning Oils

Staff Special

CHICAGO, Dec. 10

THE cold wave this week was credited by most of the oil trade here with causing active demand for seasonal products in the Chicago resale market. Demand from the jobbing trade for high test gasoline, distillate, and zero fuel and gas oils for immediate delivery was good. Several jobbers reported they were behind with furnace oil deliveries and were working overtime to catch up.

Demand for 58-60 U. S. Motor gasoline was light. Several of the trade reported they were not pushing gasoline sales but centering activity on heavier oils. A wide range of prices were reported by the trade. The majority of goods moved at 5.875 to 6.125 cents. A few sales were reported at 5.75 cents. U. S. Motor gasoline has been moved into eastern Michigan and Ohio points for as low as 5.50 cents, Group 3 freight basis, the trade reported.

Demand for high test gasolines was good. Prices were approximately the same as last week. The 60-62, 437 e.p. gasoline Monday was 6.25 cents. Tuesday it was selling at 6.125 to 6.25 cents and continued at this range the rest of the week. Movement of 60-62, 400 e.p. was mostly at 4.50 to 4.625 cents. One refiner reported running into competition below 4.50 cents but refused to meet the price. The 64-66, 375 e.p. goods continued to move at 6.875 to 7 cents. A few sales were reported at 6.75 cents.

Demand for kerosene was light in Chicago. Several sellers reported a fair business but others said they were selling only an occasional car. Most sales of the 41-43 w.w. grade were made at 4.50 cents. Some were reported at 4.625 cents and also at 4.375 cents.

One refiner reports extremely brisk movement of contract distillate. Straw distillate of 38-40 gravity was steady at 3.25 to 3.375 cents.

Zero gas oils were in steady demand after the fall in temperature Thursday. Higher cold test goods were quiet with most sales at prices near last week's closing figure. Ordinary 32-36 dark gas oil moved mostly at 2.50 cents with some sales at 2.375 cents. Zero cold test oil of like gravity moved at 2.625 to 2.75 cents until Thursday when it was advanced by most sellers and was selling at 2.75 to 2.875 cents today. Zero 32-36 straw gas oil was still reported scarce and was somewhat higher late in the week. It moved at 3 to 3.125 cents till Thursday and at 3.125 to 3.25 cents thereafter.

Prices of fuel oils were steady and generally unchanged. Good movement was reported for both spot and contract goods. Zero cold test 28-30 enjoyed the best movement of the fuel oils. It sold all week at $1 to $1.05. The 24-26 fuel continued to move mostly at $0.80 to $0.85. Fuel of 22-26 gravity moved at $0.80 to $0.825. The 18-22 grade sold mostly at $0.775 to $0.80. Smackover crude fuel quotations remained unchanged at $1 to $1.025.

Some precipitation, mostly light snow, will fall next week in Standard Oil Co. of Indiana territory. Temperatures will be below normal most of the week but will rise somewhat toward the end.

CLEVELAND, Dec. 10.—The Lincoln Electric Co. has transferred E. F. Hoff from the welder division at Cleveland to the welder division at New York, where he will be in charge of welder service under the direction of G. N. Bull, district manager.

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Week's Price Changes Tank Wagon Markets

Gasoline Changes

Standard of Indiana—T.w. and s.s. prices gasoline reduced 3.1 cents, Des Moines, to 13.9 cents and 15.9 cents respectively, including 3 cent tax, **Sept. 29.**

T.w. and s.s. prices gasoline advanced 3 cents, Huron, to 19.5 cents and 21.5 cents respectively, including 4 cent tax, **July 14.**

Swan-Finch Corporation Adds to Plant

CHICAGO, Dec. 10.—The Swan-Finch Corp., 537 S. Dearborn st., Chicago, will double the output of its Chicago plant about Jan. 1. An addition is being built to its plant at 5849 W. 66th st., Chicago, equaling the original plant in floor space and equipment. It is two stories above the grade and one below. Storage has been increased about 50,000 gallons.

E. S. Burns is general manager of the western division, which is a compounding company, specializing in specialty lubricants, mostly for the smoke stack trade. One of the company's principal items is for automobile consumption however, a pressure gun grease sold through jobbers only. The Chicago compounding plant, and warehouse employ about 30 men at present.

Exhibits Greasers at Auto Show

CLEVELAND, Dec. 12.—Two new pieces of equipment will be exhibited at the coming automobile shows by the United States Air Compressor Co. U. S. Electro-Hy-Press Greaser, designed for garages, service stations and fleet truck operators, will be exhibited first at the New York show in booth No. 106 in the gallery of the coliseum. The other new piece is U. S. Model SA-14, a greaser for small garages and country service stations. Other equipment in the company's air compressor line to be exhibited are paint spray units, and high pressure, hydraulic car washers.

Installs Absorption Towers

PITTSBURGH, Dec. 10.—The Burrell-Mase Engineering Co., formerly the G. A. Burrell Co., recently installed absorption towers and stills of their own design in gasoline absorption plants of the United Fuel Gas Co.; the Equitable Gas Co.; Manufacturers Light & Heat Co.; and the Carnegie Natural Gas Co., all with headquarters here. The stills are of the improved bubble tower design.

Tank Wagon, Service Station Markets for Gasoline and Kerosene In United States Territories and Canada

(As posted by principal marketing companies)

(OIL PRICE HANDBOOK has t.w. and s.s. markets for whole year arranged for quick reference)

These Prices In Effect December 12, 1927

S.O. NEW JERSEY TERRITORY

	Gasoline				Oil
			Total		
	T.W.	Tax	T.W.	S.S.	T.W.
Atlantic City, N. J.	16	2	18	20	14
Newark, N. J.	16	2	18	20	14
Annapolis, Md.	16	4	20	23	12
Baltimore, Md.	16	4	20	23	10
Cumberland, Md.	16	4	20	23	14
Washington, D. C.	16	2	18	21	12
Danville, Va.	16	4½	20.5	*	14
Norfolk, Va.	16	4½	20.5	23.5	12
Richmond, Va.	14	4½	18.5	21.5	14
Roanoke, Va.	16	4½	20.5	23.5	14
Petersburg, Va.	16	4½	20.5	23.5	14
Charleston, W. Va.	16	4	20	23	14
Keyser, W. Va.	16	4	20	*	14
Parkersburg, W. Va.	13	4	17	20	14
Wheeling, W. Va.	16	4	20	23	14
Charlotte, N. C.	16	4	20	23	14
Hickory, N. C.	16	4	20	23	14
Mt. Airy, N. C.	16	4	20	23	14
Salisbury, N. C.	16	4	20	23	14
Charleston, S. C.	15	5	20	23	14
Columbia, S. C.	15	5	20	23	14

*Dealers set own prices. S. O. New Jersey does not operate station.

S. O. NEW YORK

Due to local price conditions at many points in S. O. New York territory, actual prices on both gasoline and kerosene are being made at under the posted tank wagon prices published below.

*New York City	17	0	17	21	15
Albany, N. Y.	13	0	13	15	15
Buffalo, N. Y.	15	0	15	18	14
†Rochester, N. Y.	13	0	13	16	13
Syracuse, N. Y.	15	0	15	15	15
Boston, Mass.	17	0	17	18	15
Augusta, Me.	17	4	21	23	15
Manchester, N. H.	17	3	20	22	15
Burlington, Vt.	17	3	20	22	15

*In steel barrels.

†It is reported that S. O. New York is selling a second grade of gasoline at Rochester, 4c below the above posted prices which apply on its Socony grade.

ATLANTIC REFINING

Pittsburgh, Pa.	16	*	16	*22	14
Philadelphia, Pa.	15	*	15	*21	14
Allentown, Pa.	16	*	16	*22	14
Erie, Pa.	12	*	12	*18	14
Scranton, Pa.	16	*	16	*22	14
Altoona, Pa.	16	*	16	*22	14
Dover, Del.	16	3	19	22	14
Wilmington, Del.	16	3	19	22	14
Providence, R. I.	17	2	19	19	15
Boston, Mass.	17	0	17	17	15
Springfield, Mass.	18	0	18	18	15
Worcester, Mass.	17	0	17	17	15
Hartford, Conn.	18	2	20	20	15
New Haven, Conn.	18	2	20	20	15

*3-cent state tax is collected by retail dealer and paid by him directly to state.

S. O. KENTUCKY

Lexington, Ky.	13	5	18	21	15.5
Louisville, Ky.	13	5	18	21	15
Covington, Ky.	14	5	19	22	15.5
Clarksdale, Miss.	13	4	17	20	12.5
Gulfport, Miss.	††14.5	4	††18.5	21.5	14
Jackson, Miss.	13	4	17	20	13.5
Natchez, Miss.	12.5	4	16.5	19.5	14
Vicksburg, Miss.	12.5	4	16.5	19.5	14
Birmingham, Ala.‡	14	4	18	21	15.5
Mobile, Ala.‡	13	4	17	20	15
Montgomery, Ala.*‡	15	4	19	22	16.5
Atlanta, Ga.	10	4	14	16	†15.5
Augusta, Ga.	15	4	19	22	†16.5
Macon, Ga.	15	4	19	22	†16.5
Savannah, Ga.	13	4	17	19	†14.5
Jacksonville, Fla.°	13	5	18	21	14
Miami, Fla.°	15	5	20	23	15.5
Tampa, Fla.°	13	5	18	21	14
Pensacola, Fla.°	**14	5	**19	22	14

*Local privilege tax of 1 cent on gasoline and ½ cent on kerosene at Montgomery included.

‡Alabama gasoline prices include 1/40 of 1c inspection fee, effective Oct. 1, 1927.

†Georgia kerosene prices include 1c state tax.

°Florida gasoline prices include ½c inspection fee.

**Both tank wagon prices include 1c city tax at Pensacola, which went into effect Oct. 15, 1926.

††Both tank wagon prices at Gulfport include Harrison county privilege tax of 2c.

S. O. INDIANA

	Gasoline				Oil
			Total		
	T.W.	Tax	T.W.	S.S.	T.W.
Chicago, Ill.	14	2	16	18	12
Decatur, Ill.	8.5	2	10.5	12.5	12.1
E. St. Louis, Ill.	13.1	2	15.1	17.35	11.2
Joliet, Ill.	14.4	2	16.4	18.4	12.3
Peoria, Ill.	10	2	12	12	12.1
Quincy, Ill.	14.2	2	16.2	18.2	11.9
Indianapolis, Ind.	11.2	3	14.2	15.2	13.2
Evansville, Ind.	14	3	17	19	13
South Bend, Ind.	12	3	15	15	13.4
Detroit, Mich.	12.8	3	15.8	17.8	13.7
Grand Rapids, Mich.	11	3	14	16	13.6
Saginaw, Mich.	14.9	3	17.9	19.9	13.8
Green Bay, Wis.	14.6	2	16.6	18.6	12.4
Madison, Wis.	14.3	2	16.3	18.3	12.1
Milwaukee, Wis.	14.1	2	16.1	18.1	11.9
La Crosse, Wis.	15.2	2	17.2	19.2	13
Minneapolis, Minn.	12	2	14	14	12.9
Duluth, Minn.	13.5	2	15.5	17.5	12.9
Mankato, Minn.	12.1	2	14.1	16.1	12.7
Des Moines, Ia.	10.9	3	13.9	15.9	12.3
Davenport, Ia.	12.5	3	15.5	17.5	12.3
Sioux City, Ia.	14.1	3	17.1	19.1	11.9
Mason City, Ia.	14.5	3	17.5	19.5	12.3
St. Louis, Mo.	*13.6	2	15.6	17.9	11.3
Kansas City, Mo.	†12.9	2	14.9	16.9	10.6
St. Joseph, Mo.	†12.5	2	14.5	16.5	11.2
Fargo, N. D.	13	2	15	17	14.9
Grand Forks, N. D.	17.2	2	19.2	21.2	15.2
Minot, N. D.	16.9	2	18.9	20.9	14.9
Pierre, S. D.	15.5	4	19.5	21.5	13.9
Huron, S. D.	15.5	4	19.5	21.5	13.9
Wichita, Kans.	12.8	2	14.8	16.8	10.8
Bartlesville, Okla.	12.8	3	15.8	17.8	10.8

S. O. Indiana's quantity discount schedule on tank wagon deliveries of gasoline outside the city of Chicago is 1c for 50 gals. or more at one delivery; 1½c for 6,000 gals. or more a month; 2c for 10,000 gals. or more a month, and 3c for 15,000 gals. or more a month.

In Chicago, above discounts apply, except that minimum required quantity to get the 1c discount is 100 gals., instead of 50 gals. This 1c discount applies on quantities of 100 gals. and over, in addition to regular Q.D.A. discounts applying thru rest of territory, as stated above.

Service station discount is 2c per gal. to consumers of 200 gals. or more a month, or 2400 gals. per year.

Discount on kerosene is 1c on 50 gal. dumps throughout territory.

*Includes city tax of ½c.

†Includes city tax of 1c.

S. O. NEBRASKA

Omaha, Neb.	14.25	2	16.25	16.25	12.25
McCook	12.75	2	14.75	16.75	11.50
Norfolk	14.75	2	16.75	18.75	12.75
North Platte	15.75	2	17.75	19.75	13.50
Scottsbluff	15.25	2	17.25	19.25	13.00

CONTINENTAL OIL

Denver, Colo.	13	3	16	16	12.5
Pueblo, Colo.	12	3	15	15	14.5
Grand Junction, Colo.	17.5	3	20.5	22.5	18
Casper, Wyo.	14	3	17	19	13
Cheyenne, Wyo.	15	3	18	20	14.5
Butte, Mont.	19	3	22	22	19
Helena, Mont.	19.5	3	22.5	24.5	19
Salt Lake City, Utah	16.5	3½	20	21	17
Boise, Ida.	19.5	4	23.5	25.5	19
Twin Falls, Ida.	19.5	4	23.5	25.5	19
Albuquerque, N. M.	16	5	21	24	17

S. O. CALIFORNIA*

Phoenix, Ariz.	19	4	23	27	21.5
Los Angeles, Cal.	13.5	3	16.5	20.5	15.5
Fresno, Cal.	14	3	17	21	16.5
San Francisco, Cal.	14	3	17	21	15.5
Reno, Nev.	18	4	22	26	19
Portland, Ore.	14.5	3	17.5	21.5	16.5
Seattle, Wash.	14.5	2	16.5	20.5	16.5
Spokane, Wash.	18.5	2	20.5	24.5	20.5
Tacoma, Wash.	14.5	2	16.5	20.5	16.5

*On Oct. 1, t.w. price at all points for spot sales, was advanced 1c. Very large portion of deliveries are under contract carrying above prices. New customers signing contracts and selling only one brand of gasoline, are given prices published in above table.

S. O. LOUISIANA

Little Rock, Ark.	11	5	16	16	12
Alexandria, La.	13	2	15	18	†14
Baton Rouge, La.	12	2	14	17	†12.5
Lake Charles, La.	13.5	2	15.5	18.5	†14
New Orleans, La.	13.5	2	*15.5	*17.5	†14
Shreveport, La.	13.5	2	15.5	18.5	†13
Lafayette, La.	13	2	15	18	†13.5
Bristol, Tenn.	16	3	19	22	14
Chattanooga, Tenn.	16.5	3	19.5	22.5	15
Knoxville, Tenn.	16.5	3	19.5	22.5	15
Nashville, Tenn.	15	3	18	21	15
Memphis, Tenn.	12	3	15	16.5	14

*New Orleans gasoline prices include 1c parish tax in addition to 2c state tax, and kerosene prices include 1c state tax and 1c parish tax.

†Kerosene price in Louisiana includes 1c state tax.

S. O. OHIO

	Gasoline				Oil
			Total		
	T.W.	Tax	T.W.	S.S.	T.W.
All Ohio points	14	3	17	19	14

MAGNOLIA PETROLEUM

Muskogee, Okla.	12	3	15	18	10
Oklahoma City	10	3	13	14	10
Tulsa, Okla.	10	3	13	14	10
Fort Smith, Ark.*	13	*3	16	19	12
Little Rock, Ark.	11	5	16	16	12
Texarkana, Ark. *	12	*3	15	18	12
Dallas, Tex.	11	3	14	17	11
Fort Worth, Tex.	11	3	14	16	10
Houston, Tex.	10	3	13	15	15
San Antonio, Tex.	10	3	13	15	10
El Paso, Tex.	11	3	14	15	16

*Within City of Texarkana and Fort Smith, the state tax on gasoline is 3c per gal. conforming with the Texas state tax. In these two districts outside of the city the 5c Arkansas tax applies.

V. M. & P. NAPHTHA

(Changes ordinarily occur coincident with gasoline price changes)

	Oleum Spirits	V.M. & P. Naphtha	Cleaner Naphtha
Chicago	16	18	18
Detroit	17.7	19.7	19.7
Kansas City	16.2	†18.2	†18.2
Milwaukee	16.7	*20.7	*20.7
Minneapolis	*20	*22	*22
St. Louis	15.9	17.9	17.9
New York	...	19	....

*Includes 2c state tax.

†Includes 1c city tax.

CANADA

(Per Imperial Gallon, which is 1.2 American Gallons)

ONTARIO

	Gasoline				Oil
			Total		
	T.W.	Tax	T.W.	S.S.	T.W.
Toronto	19.5	3	22.5	26	21
Ottawa	19.5	3	22.5	26	21
Cochrane	24.5	3	27.5	36	26
Ft. William	24.5	3	27.5	31	23.5

MANITOBA

Winnipeg	24.5	3	27.5	31	23.5

SASKATCHEWAN

Regina	27.5	0	27.5	32	26.5

ALBERTA

Edmonton	26.5	3	29.5	33	25.5
Calgary	22.5	3	25.5	29	23.5

BRITISH COLUMBIA

Vancouver	21	3	24	28	22

QUEBEC

Montreal	20.5	3	23.5	27	21
Quebec City	22.5	3	25.5	31	23
Three Rivers	22.5	3	25.5	30	23

NEW BRUNSWICK

St. John	24.5	3	27.5	32	24
Moncton	24.5	3	27.5	32	24

NOVA SCOTIA

Halifax	24.5	3	27.5	32	24
Sydney	24.5	3	27.5	32	24

PRINCE EDWARD ISLAND

Charlottetown	24.5	3	27.5	31	24

Note: In districts surrounding these points additional is added to city price.

Exporters Advance Light Gasoline Prices in Gulf Market

Staff Special
NEW YORK, Dec. 10

INTEREST in Gulf export markets this week centered largely around the advances in quotations for light oils. The lull evidenced in foreign buying last week continued this week.

The continued scarcity of high gravity gasoline available for reasonably prompt shipment caused several exporters to advance their prices for 64-66, 375 end point gasoline to 8.50 cents and other grades of gasoline likewise were quoted 0.25 cent higher in several quarters.

The single inquiry from Independent foreign buyers reported in Gulf export markets this week came too late in the week to be a factor in determining actual selling price of 64-66, 375 end point gasoline. A French buyer was seeking approximately 55,000 barrels of this grade for January shipment and the business is not scheduled to be closed until early next week. The occasional offers to buy and sell were all that the trade had to be governed by in its opinions of the market.

Kerosene was steady at 7 cents for water white and 6 cents for prime white. The gas oil market was inactive but 4.125 cents continued to be the minimum quotation.

Cargoes of Grade C were selling as low as $1.02 a barrel. Still lower prices were heard but confirmation of sales under $1.02 was lacking. Bunkers also were approximately 5 cents a barrel cheaper. In the New Orleans district, Grade C for bunkering sold at $1.25 and further west on the Gulf at $1.15.

South American buyers were active in the wax market at New Orleans and several sizeable quantities of white crude scale were reported sold for shipment in February and March at 2.625 to 2.75 cents a pound. Fully refined wax was offered at 3.50 to 3.625 cents a pound.

Gasoline Movement to Domestic Trade is Good on East Coast

Staff Special
NEW YORK, Dec. 10

GASOLINE at eastern refineries and seaboard terminals was fairly steady this week. Movement was good considering the season.

While the middle west was in the throes of a blizzard, what seemed like a return of early fall weather spread over the Atlantic seaboard early this week and calls from jobbers for rush shipments of gasoline were frequently received. As the week advanced, and the cold wave moved eastward consumption slowed considerably. However, the heavy fall of snow which accompanied the storms in the middle west, were lacking in the east so motoring was possible.

Consumption has held fairly steady. One large tank car dealer in New York said his company's shipments for December would almost equal their October and November shipments.

Prices in all eastern markets, except the New England district, were stationary. Most New York refiners and resale agents quoted U. S. Motor gasoline in tank cars at 8 to 8.25 cents. Some refiners whose outputs for December are committed, reported straight contract goods moved fairly well. A minimum price of 8.25 cents for U. S. Motor was quoted by most Philadelphia refiners. One large refiner in the Philadelphia market continued to quote 8.50 cents.

Competition for gasoline orders was keener, New England refiners reported, and prices were down approximately 0.25 cent. U. S. Motor gasoline was quoted at 7.75 cents, f.o.b. refinery, by one large refiner in New England, wheras others reduced their prices to a minimum of 8 cents at which price the bulk of business was placed.

Although kerosene was more freely offered jobbers were more active and prices were generally steady. New York harbor was the only section where water white goods were available at 7 cents; refiners in other districts quoted a minimum of 7.25 cents and several continued to report good movement at 7.50 cents.

Greater interest was displayed in the burning oil market. The cold weather has stimulated consumption appreciably and distributors were buying more freely. Prices showed no reaction, however, and 28-34 gas oil for domestic burners was available at 5 cents a gallon. Gas oil suitable for industrial fuel was offered 0.25 cent lower.

Early in the week, one large refiner was offering bunker oil at $1.20 a barrel, New York harbor. Considerable business was placed at this price, but no reduction in posted prices resulted. At the end of the week, all suppliers were quoting $1.35 for Grade C.

Wax More Active; Prices Improve at New York

Staff Special

NEW YORK, Dec. 10.—A slightly better demand for white crude scale from foreign buyers was noted in New York this week. Prices were up 0.125 cent from last week's minimum. A few small lots sold at 2.70 cents a pound but these were offset by one or two moderate sized sales at 2.875 cents. The market averaged 2.75 cents a pound.

There was less short selling and it was also felt that extensive buying by South Americans at the Gulf tended to bolster the New York market.

There was little change in prices for fully refined waxes and not much activity was reported. The 125-127 A.m.p. fully refined wax was offered at 3.75 cents a pound. High melting point grades continued relatively scarce and nominal in price.

The spot lubricating oil market was virtually dead. Several prospective contracts for next year were open for negotiation. Buyers have not been able to contract for their next year's requirements at current prices, which they have been attempting to do. Consequently considerable business is hanging fire.

Acquires More Station Sites

CLEVELAND, O., Dec. 12.—Properties for bulk and service stations have been purchased by the Columbia Refining Co. at Geneva, Monroeville and Wellington, O. at which points construction will begin at once, according to Burt Zimmerman, general manager.

Sites for stations have also been acquired at Akron, and other Ohio points. The company's headquarters are at Cleveland.

A new single-operator welder is announced by General Electric Co. as the latest addition to its standard line of welding equipment. The generator is rated 300 amperes, one hour, 50 degrees C., and the driving motor is a 15-horsepower, 40 degree C., continuous-rated unit. The generator is so designed that field control is unnecessary and is eliminated. The generator is designed to permit belt, motor or engine drive, and will be designed for either stationary or portable use. It can be used as both a manufacturing and a repair tool, for service marine repair yards, tank shops, and in many other fields where iron or steel is used. It bears the General Electric designation WD-300-B

Complete Seaboard Market

(Export markets for whole year given in OIL PRICE HANDBOOK. Each volume carries refinery, tank wagon, crude and export markets—complete for the years 1924-1925-1926)

Eastern Domestic Market

(Prices for tank car lots, f.o.b. refinery or seaboard terminal, represent majority of quotations and sales.)

	Dec. 12	Dec. 5	Nov. 28
U.S. Motor gasoline, New York harbor	8.00 – 8.25	8.00 – 8.25	8.00 – 8.50
U.S. Motor gasoline, Philadelphia	8.25 – 8.50	8.25 – 8.50	8.25 – 8.50
U.S. Motor gasoline, New England	8.00	8.00	8.00 – 8.25
U.S. Motor gasoline, Baltimore	8.00 – 8.50	8.00 – 8.50	8.25 – 8.50
U.S. Motor gasoline, Norfolk	8.25 – 8.50	8.25 – 8.50	8.25 – 8.50
U.S. Motor gasoline, Wilmington	†8.50	†8.50	†8.50
U.S. Motor gasoline, Charleston	8.00	8.00	7.75 – 8.00
U.S. Motor gasoline, Savannah	7.75	7.75	7.50 – 7.75
U.S. Motor gasoline, Jacksonville	7.75	7.75	7.50 – 7.75
California U.S. Motor gasoline, Baltimore	8.50	8.50	8.50
California U.S. Motor gasoline, Philadelphia	8.50	8.50	8.50
Water white kerosene, New York harbor	7.00 – 7.50	7.00 – 7.50	7.00 – 7.50
Water white kerosene, Philadelphia	7.25 – 7.50	7.25 – 7.50	7.25
Water white kerosene, Baltimore	7.25 – 7.50	7.25 – 7.50	7.00 – 7.50
Water white kerosene, New England	†7.50	†7.50	7.25
28-34 gas oil, New York harbor	4.75 – 5.00	4.625– 5.00	4.75 – 5.00
28-34 gas oil, New England	4.50 – 5.00	4.50 – 5.00	4.50 – 5.00
38-42 furnace oil, New York harbor	6.00	6.00	6.00
36-40 furnace oil, New England	5.50 – 6.00	6.00	6.00
Grade C bunker oil, New York harbor	$1.35	$1.35	$1.40
Grade C bunker oil, New England	$1.40	$1.40	$1.45
Diesel oil, New York harbor	2.10	$2.10	$2.10
MEDICINAL OILS			
Russian 885-890 s.g., 325-330 vis.	$0.80 – 0.90	$0.80 –$0.90	$0.80 –$0.90
Russian 870-875 s.g., 150-155 vis.	$0.67 – 0.77	$0.67 –$0.77	$0.67 –$0.77
Russian 860-865 s.g., 80-85 vis.	$0.65 – 0.75	$0.65 –$0.75	$0.65 –$0.75

†Only one refiner quoting.

New York Export Market

(Gasoline and kerosene in cases in bulk. Lubricating oils are all Penna. products, prices per gal. in bbls.)

	Dec. 12	Dec. 5	Nov. 28
U. S. Motor gasoline	23.90	23.90	23.90
43-45, 150 w.w. kerosene	18.15	18.15	18.15
42-44, 110 s.w. kerosene	17.15	17.15	17.15
CYLINDER OILS			
Bright stock, dark	35.00 –36.00	35.00 –36.00	35.00 –36.00
600 D filtered	30.00 –31.00	30.00 –31.00	30.00 –31.00
600 Warren E filtered	25.00	25.00	25.00
600 s.r. unfiltered	17.00 –17.50	17.00 –17.50	17.00 –17.50
650 s.r. unfiltered	18.50 –19.00	18.50	18.50
600 flash s.r.	20.00	20.00	20.00
630 flash s.r.	33.00	33.00	31.00 –33.00
RED ENGINE OILS (Vis. 100°)			
300 vis. No. 6½ color	20.00	20.00	20.00
250 vis. No. 6 color	19.00	19.00	19.00
200 vis. No. 6 color	18.50	18.50	18.50
PALE ENGINE OILS (Vis. 100°)			
230 vis. No. 3¾ color	24.00	24.00	24.00
180 vis. No. 3¼ color	20.00	20.00	20.00
100 vis. No. 2¼ color	15.75	15.75	15.75
MOTOR OILS (Vis. 100°)			
600 vis. No. 7 color	35.00	35.00	35.00
500 vis. No. 6½ color	33.00	33 00	33.00
400 vis. No. 7¼ color	31.00	31 00	31.00
300 vis. No. 6 color	30.00	30.00	30.00
200 vis. No. 3¼ color	24.00	24.00	24.00
MEDICINAL OILS			
875-885 s.g.	$0.80	$0.80	$0.80
865-870 s.g.	$0.70	$0.70	$0.70

WAXES (In cents per pound, f.a.s. carload lots)

WHITE CRUDE SCALE (In barrels)

	Dec. 12	Dec. 5	Nov. 28
122-124 A.m.p.	2.75	2.625– 2.75	2.625– 2.75
124-126 A.m.p.	2.75	2.625– 2.75	2.625– 2.75
FULLY REFINED (In burlap bags)			
123-125 A.m.p. Phila.	3.75	3.75	3.75
125-127 A.m.p.	3.75	3.75	3.75
128-130 A.m.p.	3.875– 4.125	3.875– 4.125	3.875– 4.125
130-132 A.m.p.	4.375– 4.50	4.375– 4.50	4.375– 4.50
133-135 A.m.p.	*5.50	*5.50	*5.50
135-137 A.m.p.	*5.75 – 6.00	*5.75– 6.00	*5.75 – 6.00
YELLOW CRUDE SCALE			
124-126 A.m.p.	2.625	2.625	2.625

***Prices nominal.**

Gulf Export Market

(F.O.B. Gulf oil terminals in Texas and Louisiana, shipments of 20,000 bbls. and over, except where otherwise noted.)

GASOLINE	Dec. 12	Dec. 5	Nov. 28
U. S. Motor	7.00 – 7.25	7.00	7.00 – 7.25
60-62, 400 e.p.	*7.75 – 8.00	*7.75	.....
61-63, 390 e.p.	8.00 – 8.25	8.00	8.00
64-66, 375 e.p.	8.50	8.25	8.25
U. S. Motor, cases (cargoes)	$1.60	$1.60	$1.60
64-66, cases (cargoes)	$1.75	$1.75	$1.75
***Nominal.**			
KEROSENE			
44 water white	7.00	7.00	7.00
41-43 prime white	6.00	6.00	6.00
Water white, cases (cargoes)	$1.60	$1.60	$1.60
Prime white, cases (cargoes)	$1.50	$1.50	$1.50
DOMESTIC GAS & BUNKER OILS			
*26-28 gas oil	4.125– 4.25	4.125– 4.25	4.25
*30-32 gas oil	4.25	4.25 – 4.50	4.25 – 4.50
Grade C bunker oil	$1.15 –$1.25	$1.20 – 1.30	$1.20 –$1.30
Grade C bunker oil, cargoes	$1.02 –$1.05	$1.05	$1.05 –$1.10
***Translucent thru neck of 4 oz. bottle.**			
MEXICAN CRUDE AND BUNKER OILS (F.O.B. Steamer, Tampico)			
Heavy Panuco crude taxes to be paid	$1.10 –$1.16	$1.10 – 1.16	$1.10
Grade C bunker oil, for bunkering purposes, taxes paid	$1.35	$1.35	$1.35

SOUTH TEXAS LUBRICATING OILS (Viscosity at 100° F.; cold test 0) (Tanker, f.o.b. Houston)

100 vis. No. 2 unfiltered pale	6.00 – 6.50	6.00 – 6.50	6.00 – 6.50
200 vis. No. 3 unfiltered pale	8.00 – 9.00	8.00 – 9.00	8.00 – 9.00
300 vis. No. 3 unfiltered pale	9.00 –10.00	9.00 –10.00	9.00 –10.00
500 vis. No. 3½ unfiltered pale	11.00 –11.50	11.00 –11.50	11.00 –11.50
200 vis. No. 5½ red oil	7.00 – 7.50	7.00 – 7.50	7.00 – 7.50
400 vis. No. 5½ red oil	8.00 – 8.50	8.00 – 8.50	8.00 – 8.50
500 vis. No. 6 red oil	10.00	10.00	10.00

Pacific Export Market

(Quotations are at seaboard, Los Angeles, in cargo lots, cents per gallon, except where otherwise noted.)

	Dec. 12	Dec. 5	Nov. 28
Gasoline, U. S. Motor, 53-55 Gravity	6.00 – 7.00	6.00 – 6.50	6.00 – 6.50
Gasoline, U. S. Motor, blends and special cuts	7.00 – 8.00	7.00 – 8.00	7.00 – 8.00
Gas Oil, 30-34, per barrel	$1.05 –$1.10	$1.05 –$1.10	$1.00 –$1.05
Diesel Oil, 27 plus, per barrel	$0.85 –$1.00	$0.85 –$1.00	$0.85 –$1.00
Bunker oil, 14-18, per barrel	$0.80 –$1.00	$0.80 –$1.00	$0.80 –$1.00
Fuel oil, 14-18, per barrel	$0.75 –$1.00	$0.75 –$1.00	$0.75 –$1.00
Kerosene, 38-40 w.w., 125-150 flash, per gal.	4.50 – 5.00	4.50 – 5.00	4.50 – 5.00
Cased Goods			
Gasoline, U. S. Motor	$1.70 –$1.80	$1.70 –$1.80	$1.70 –$1.80
Kerosene, 38-40 w.w., 125-150 flash	$1.35 –$1.50	$1.35 –$1.50	$1.35 –$1.50

Crude Oil Prices, as Posted by Major

(Crude prices for years 1924-1925-1926 in

EASTERN FIELDS

(Posted by Joseph Seep Purchasing Agency)

Penna. Grade Oil in New York Transit Lines (Alleghany, N. Y. District)	$2.75
Bradford District Oil in National Transit Lines (Bradford District)	2.75
Penna. Grade Oil in National Transit Lines (Other Pennsylvania)	2.60
Penna. Grade Oil in Southwest Penna. Pipe Lines (Other Pennsylvania)	2.60
Penna. Grade Oil in Eureka Pipe Lines (West Virginia)	2.55
Penna. Grade Oil in Buckeye Pipe Lines (Macksburg, O. district)	2.25
Keister Grade in National Transit Lines (Butler Co.)	1.10
Cabell Grade in Eureka Pipe Lines (West Virginia)	1.50
Corning Grade in Buckeye Pipe Lines (Ohio)	1.45
Corning, O. heavy grade	1.35
*Somerset Oil in Cumberland Pipe Lines (Kentucky)	1.60
Ragland Grade in Cumberland Pipe Lines (Kentucky)	.95

*Somerset oil run prior to Oct. 1922, takes price of 6 cents lower than above quotations.

(Posted by Stoll Oil Refining Co.)

Oil City, Ky., oil in Stoll lines $1.50

CENTRAL STATES FIELDS

Posted by Ohio Oil Co.

Effective March 14, 1927

Wooster	$1.57	Plymouth	$1.33
Lima	1.71	West. Kentucky	1.33
Waterloo	1.20	*Canadian Petro.	2.11
Indiana	1.48	*Oil Springs	2.18
Princeton	1.60	*Posted by Imperial Oil Ltd.	
Illinois	1.60		

OKLAHOMA, KANSAS And NORTH TEXAS

Prices of Prairie Oil & Gas Co.

(In Oklahoma, Kansas, North and East Central Texas)

Effective March 12, 1927

28-28.9	$1.12	35-35.9	$1.26
29-29.9	1.14	36-36.9	1.28
30-30.9	1.16	37-37.9	1.30
31-31.9	1.18	38-38.9	1.32
32-32.9	1.20	39-39.9	1.34
33-33.9	1.22	40-40.9	1.36
34-34.9	1.24	41-41.9	1.38
42-42.9	$1.40	48-48.9	$1.52
43-43.9	1.42	49-49.9	1.54
44-44.9	1.44	50-50.9	1.56
45-45.9	1.46	51-51.9	1.58
46-46.9	1.48	52 and above	1.60
47-47.9	1.50		

Above schedule met on March 12, by Gulf, Mid-Continent Pet. Corp., and Empire; by Carter, Humble and The Texas Co. on March 14.

Humble Oil & Refining Co. Prices
(Ranger, North Texas, Mexia, Powell, Richland, Wortham, Lytton Springs, Currie, Moran and Nocona crudes all in Texas.)

March 14, same schedule as Prairie in above fields, except these grades posted Nov. 16:

Below 25	$0.90	26-26.9	$1.08
25-25.9	1.06	27-27.9	1.10
Mirando, Tex.			$1.00

Magnolia Petroleum Co.
(In Oklahoma, Kansas and North and East Central Texas)

Effective Sept. 14, Magnolia posted same price schedule as Prairie in above fields, in Panola Co. and Iatan, Tex. district, except that Magnolia is paying $1.05 for all oil below 30 gravity.

Glasscock County	$0.80
Corsicana heavy	$1.00

Carter Oil Co.
(Oklahoma and Kansas)

March 14, same schedule as Prairie.

PANHANDLE, TEXAS
Humble Oil & Refining Co.

Effective Aug. 23

Hutchinson, Carson and Wheeler Counties			$0.75
Pampa, Gray County, Effective March 14:			
28-28.9	$ .80	37-37.9	$ .98
29-29.9	.82	38-38.9	1.00
30-30.9	.84	39-39.9	1.02
31-31.9	.86	40-40.9	1.04
32-32.9	.88	41-41.9	1.06
33-33.9	.90	42-42.9	1.08
34-34.9	.92	43-43.9	1.10
35-35.9	.94	44 and above	1.12
36-36.9	.96		

WEST TEXAS
Humble Oil & Refining Co.

Effective Aug. 23

Crane, Upton, Crockett and Pecos Counties	$0.60

NORTH LOUISIANA — ARKANSAS FIELDS

Prices of Standard Oil Co. of Louisiana Caddo, Homer, Haynesville, Bull Bayou, El Dorado, Crichton and De Soto

Effective March 14, 1927

Below 28	$1.10	40-40.9	$1.36
28-28.9	1.12	41-41.9	1.38
29-29.9	1.14	42-42.9	1.40
30-30.9	1.16	43-43.9	1.42
31-31.9	1.18	44-44.9	1.44
32-32.9	1.20	45-45.9	1.46
33-33.9	1.22	46-46.9	1.48
34-34.9	1.24	47-47.9	1.50
35-35.9	1.26	48-48.9	1.52
36-36.9	1.28	49-49.9	1.54
37-37.9	1.30	50-50.9	1.56
38-38.9	1.32	51-51.9	1.58
39-39.9	1.34	52 and above	1.60

*Smackover, below 24	$0.85
* do 24 and above	1.00
Bellevue	1.25
Cotton Valley	.85
**Urania, La.	.75
†East El Dorado	1.00

**Posted by Louisiana Oil Refining Corp.

†Posted by Magnolia Petroleum Co.

*Smackover prices posted on Nov. 21 by S. O La., Gulf, Shreveport-El Dorado Pipe Line, Atlantic Oil Producing Co. and Magnolia Pet Co.; on Nov 19 by La. Oil Refg. Corp.; on Nov. 23 by The Texas Co.

STEPHENS, ARKANSAS

Atlantic Oil Producing Co. and Louisiana Oil Refining Corp.

Below 28	$1.00	30-30.9	$1.06
28-28.9	1.02	31-31.9	1.08
29-29.9	1.04	32 and above	1.10

GULF COASTAL

Posted by Humble Oil & Refining Co.

Effective March 14

Grades A	$1.20	29-29.9	$1.25
Grades B:		30-30.9	1.27
Below 25	1.15	31-31.9	1.29
25-25.9	1.17	32-32.9	1.31
26-26.9	1.19	33-33.9	1.33
27-27.9	1.21	34-34.9	1.35
28-28.9	1.23	35 and above	1.37

Fields classified as A and B are Spindletop, Goose Creek, Hull, Liberty, Sour Lake, West Columbia, Orange, Boling and Pierce Junction. All other fields are Grades A only.

Small California Refiners Offer Premiums for Light Crude

Staff Special

LOS ANGELES, Dec. 9

REFINABLE crude was much in demand this week in southern California, with some offers of as high as 10 to 12 cents premium for spot movement for use at small refineries.

The asking price for gasoline to move by rail outside the state was 7 cents and up. The smaller refiners were asking 8 to 8½ cents without tax for movement to points within the state. The smaller refiners are presenting an almost solid front and are not shading their asking prices.

For export, gasoline was still available at 6 cents for spot sales, but buyers are still trying to shave this price without any real success. Some gasoline has moved to the East coast in recent weeks in tankers owned by sellers at a price that would permit the gasoline to be sold on East Coast at 8 to 8.50 cents at a profit to the buyer.

Gas oil continues to sell mostly at $1.05 to $1.10 with one sale reported at $1.03 and other at about the same figure.

There is no change in fuel oil prices, with major companies holding for 80 cents and up for export. The tank car trade was buying at 10 to 15 cents under the export price.

Some natural gasoline could be bought this week at 8.50 cents, although the ruling spot price was 9 cents. Contracts are ruling around 9.50 cents. There is an overproduction of natural gasoline in California, but around 90 per cent of the state's production is contracted for over a period, leaving little spot stuff.

Kerosene was steady.

* * *

Los Angeles Shipments

LOS ANGELES, Dec. 9.—Twenty-four tankers left Los Angeles harbor last week for points outside of Pacific coast trade territory carrying 1,553,059 barrels of petroleum products, representing daily average export movement of 221,865 barrels. This compares with total of 1,176,263 barrels or a daily average of 168,037 barrels the previous week.

Week's total movement was 146,220 barrels of crude, 500,524 barrels of fuel, 685,783 barrels of gasoline, 124,032 barrels of kerosene, 73,834 barrels of distillate and 22,666 barrels of Diesel. Atlantic domestic drew 79,240 barrels of crude, 408,459 barrels of gasoline and 73,834 barrels of distillate. Pacific foreign drew 66,980 barrels of crude, 211,568 barrels of fuel, 62,566 barrels of gasoline and all of the kerosene. Balance of total went to Atlantic foreign.

Purchasers, in All Fields (in Effect December 12)

OIL PRICE HANDBOOK published annually)

GULF COASTAL

Prices of The Texas Co.

(Effective March 14)

Grades A	$1.20	*Grades B	$1.15
‡Grades B (light crude):			
35-35.9	$1.37	38-38.9	$1.43
36-36.9	1.39	39-39.9	1.45
37-37.9	1.41	40 and above	1.47

*Grades B include all heavy crudes which do not meet tests for Grades A or for Gulf Coast light crude.

‡The Texas Co.'s gravity and price schedule on oil below 35° is same as Humble's postings on Grades B.

ROCKY MOUNTAIN FIELDS

Prices of Ohio Oil Co. and Midwest Refining Co.

(Salt Creek prices effective March 12)

‡Salt Creek 29-29.9	$1.14
" " 30-30.9	1.16
" " 31-31.9	1.18
" " 32-32.9	1.20
" " 33-33.9	1.22
" " 34-34.9	1.24
" " 35-35.9	1.26
" " 36-36.9	1.28
" " 37 and above	1.30
Elk Basin	1.33
Grass Creek light	1.33
Big Muddy	$1.25
Lance Creek	1.33
Rock Creek	1.25
Mule Creek	1.30
Rex Lake	1.10
‡Osage	1.33
‡Cat Creek, Mont.	1.33
Sunburst, Mont.	1.35
‡Hogback, N. Mex.	1.38
Artesia, N. Mex.	1.00

‡Posted by Midwest Refining Co. Midwest also buys Grass Creek light and Elk Basin.

The Texas Co. buys Salt Creek and Big Muddy crude.

CALIFORNIA

Standard Oil Co. of California

Santa Maria and Ventura Posted by Union Oil Co.

Gravity	Signal Hill Seal Beach Huntington Beach	Inglewood Torrance	Whittier La Habra	Newhall, McKittrick, Kern River	Olinda-Brea Canon, Richfield	Athens-Rosecrans Dominguez	Montebello	Coyote Hills	Santa Fe Springs	Midway Sunset Buena Vista & Elk Hills	Lost Hills	Coalinga	Wheeler Ridge	Santa Maria	Ventura
14-14.9	$ .85	$ .85	$ .85	$ .75	$ .85	....	$ .85	$ .85	....	$ .75	$ .75	$ .75	$ .75	$ .85	$ .85
15-15.9	.85	.85	.85	.75	.85	....	.85	.85	....	.75	.75	.75	.75	.85	.85
16-16.9	.85	.85	.85	.75	.85	....	.85	.85	....	.75	.75	.75	.75	.85	.85
17-17.9	.85	.85	.85	.75	.85	....	.85	.85	....	.75	.75	.75	.75	.85	.85
18-18.9	.85	.85	.85	.75	.85	....	.85	.85	....	.75	.75	.75	.75	.85	.85
19-19.9	.85	.85	.85	.75	.85	....	.85	.85	....	.75	.75	.75	.75	.85	.85
20-20.9	.85	.85	.85	....	.85	....	.85	.85	..	.77	.77	.76	.76	.85	.85
21-21.9	.86	.86	.85	....	.86	....	.85	.86	.85	.79	.79	.77	.77	.85	.85
22-22.9	.87	.87	.85	....	.87	....	.85	.87	.85	.81	.81	.78	.78	.85	.85
23-23.9	.88	.88	....	....	.88	....	.85	.88	.85	.83	.83	.79	.79	.85	.85
24-24.9	.89	.89	....	....	.89	$ .89	.85	.89	.85	$ .85	.85	.80	.80	.85	.85
25-25.9	.90	.90	....	....	.90	.90	.86	.90	.86	.87	.87	.81	.81	.86	.86
26-26.9	.92	.92	....	....	.92	.92	.87	.91	.87	.89	.89	.83	.82	.87	.87
27-27.9	.94	.94	....	....	.94	.94	.88	.92	.88	.91	.91	.85	.83	.88	.88
28-28.9	.96	.96	....	....	.96	.96	.89	.93	.89	.93	.93	.87	....	.89	.89
29-29.9	.98	....	....	....	.98	.98	.90	.94	.91	.96	.96	.89	....	.91	.91
30-30.9	1.00	....	....	....	1.00	1.00	.91	.95	.93	.99	.99	.91	....	.93	.93
31-31.9	1.03	....	....	....	....	1.03	....	....	.95	1.02	1.02	.93	....	....	.95
32-32.9	1.06	....	....	....	....	1.06	....	....	.97	1.05	1.05	.95	....	....	.97
33-33.9	....	....	....	....	....	1.09	....	....	.99	1.08	1.08	.97	....	....	.99
34-34.9	....	....	....	....	....	1.12	....	....	1.01	....	1.11	.99	....	....	1.01
35-35.9	....	....	....	....	....	1.15	....	....	1.03	....	....	1.01	....	....	1.03
36-36.9	....	....	....	....	....	1.18	....	....	1.06	....	....	....	....	....	1.06
37-37.9	....	....	....	....	....	1.21	....	....	1.09	....	....	....	....	....	1.09
38-38.9	....	....	....	....	....	1.24	....	....	1.12	....	....	....	....	....	1.12
39-39.9	....	....	....	....	....	1.27	....	....	1.15	....	....	....	....	....	1.15
40-40.9	....	....	....	....	....	1.30	....	....	....	....	....	....	....	....	....
41-41.9	....	....	....	....	....	1.33	....	....	....	....	....	....	....	....	....
42-42.9	....	....	....	....	....	1.36	....	....	....	....	....	....	....	....	....

*Union Oil Co. also purchases Long Beach Crude and is maintaining the same gravity and price schedule in that field as the Standard maintains in Signal Hill and Huntington Beach fields. The Union also buys and pays the same prices as the Standard in the Rosecrans-Dominguez fields, on gravities ranging from 14 degrees to and including 24.9 degrees and in Santa Fe Springs, on gravities ranging from 20 to and including 23.9 degrees.

Five Jobbers Meetings In February 1928

CHICAGO, Dec. 10.—February will be a busy month for state association meetings. There will be one or two meetings a week all month. Secretaries of state associations met informally here during the American Petroleum Institute meeting and arranged dates to avoid conflict as far as possible. They have not yet named the place of meeting in all cases.

It has been agreed that the North Dakota convention shall conflict with the one in Michigan, Feb. 2 and 3. The North Dakotans will assemble in Fargo; the Michigan group at the Statler hotel in Detroit. Iowa jobbers assemble Feb. 8 and 9, probably in Des Moines but the place has not been announced. The Illinois meeting has been scheduled for Feb. 15 and 16, place to be announced later.

The Ohio jobbers have already announced their meeting at the Neil House in Columbus, Feb. 22, 23 and 24. Those dates are within a week of the spring convention dates of the American Oil Men's association, Stevens hotel, Chicago early in March.

Funk, Campbell Resign From Committee

LOS ANGELES, Dec. 9.—At the regular monthly meeting of the California Natural Gasoline Association in Los Angeles Dec. 7, I. B. Funk resigned as vice-president and J. A. Campbell and Mr. Funk resigned as members of the executive committee. These resignations were due Mr. Campbell being better known as a manufacturer of equipment than as directly engaged in manufacturing natural gasoline. M. Funk recently joined a new company that will conduct research work and manufacture and sell plant equipment. A resolution was adopted thanking these two men for their untiring efforts to make the organization a success.

Another resolution was adopted thanking the Natural Gasoline Association of America for sending Dr. G. G. Brown to the fall meeting in Los Angeles in November.

Pres. George L. Ratcliffe stated that an additional committee had been provided with J. A. Campbell as chairman. This body will map out a compaign of an educational nature for the benefit of the members of the local association.

R. A. Keans of the Union Oil Co., read a paper on "Gas Measurement by Orifice Meter", and W. G. Palmer read the second part of his paper "Production of Natural Gasoline by Conservation of Vapors".

Correction

Price of Waterloo crude has been in error at $1.35 since May 10. On that date price was reduced 15 cents, to $1.20 which is the price as of Dec. 12.

Bureau Of Mines Gives Facts On Gas-Oil Tests

WASHINGTON, Dec. 10

RESULTS of Bureau of Mines test on gas-oil ratio of certain wells in Salt Creek field in Wyoming are given out in a bulletin from the Department of Commerce. The bulletin states that the experimental work consisted of producing the wells as follows: (1) through casing with the flow controlled by means of (a) gate valves and (b) flow nipples in the flow line; (2) through plain tubing; (3) through tubing with the oil flow controlled by (a) gate valves at the top of the tubing and (b) flow nipples at the bottom; (4) by "stop-cocking"; (5) by means of flow devices at the bottom of the tubing; (6) through tubing and packer.

The experimental work brought out the following facts, the bulletin states:

The use of back pressure, control, or pinching was limited in these tests in the Salt Creek field to securing gas-oil ratios below the open-flow casing basis, and should not be used at random in any field without studying the individual well.

There are three classes of wells: those which yield reduced gas-oil ratios under control; those which do not; and those belonging to a middle class which have characteristics of both of the other types.

Wells of the first class will probably give results under any type of control. Wells of the second class will probably not respond at all, while those under the third classification may occasionally give a reduction in ratios; but detailed experiments would have to be performed to determine what type of control would be satisfactory.

Reducing gas-oil ratios usually means reduction in daily oil production.

The question of efficiency is probably related directly to the amounts of gas and oil, their respective velocities, and the expansion of gas. If methods of producing cause the ratio between velocities of gas and oil to increase beyond a critical point, it is believed inefficiency will result. This point probably varies in each well. Additional experimenting will be done in connection with this problem.

Casing flow and its control by gate valves usually gave inefficient results in gas-oil ratios, with a few exceptions.

Casing flow of a certain percentage of the total open flow was easier to control by flow nipples or "beans" and gave somewhat better gas-oil ratios than did gate-valve control.

Producing a well through tubing was generally the best arrangement, thereby obtaining increase of efficiency; although there were exceptions. In those exceptions, however, it is believed some tubing arrangement would have given the desired results.

There seems to be a critical point based on percentage flow above and below which a well will respond in some manner with a reduction of gas-oil ratios.

Although there seems to be no consistent relation between pressure and gas-oil ratios, in general, methods of producing which give small flowing pressures are the most efficient.

The work indicated that pressures plotted against per cent flow gave straight line curves for inefficient wells, and curves resembling hyperbolas for efficient ones.

A more complete study of this problem, with special reference to oil fields in the Rocky Mountain region, is now being made by the Bureau of Mines. The results of the tests in the Salt Creek field are described in Serial 2833, copies of which may be obtained from the United States Bureau of Mines, Department of Commerce, Washington, D. C.

Galena-Signal of Texas In Receivership

HOUSTON, Dec. 12.—McDonald Maechum of Houston was appointed this week receiver for the Galena-Signal Oil Co. of Texas on application of the Galena-Signal Oil Co. of Franklin, Pa., the parent company. Depressed markets and inability to sell products was given as the reason for the receivership.

The receivership for the Galena Signal Oil of the Texas company will in no way affect the operating program of the parent company, it was announced in Houston by the president of the latter corporation, J. A. Bertin of New York.

The Fidelity Trust Co., a J. S. Cullinan institution, is a defendant in the district court receivership suit because it is trustee for the bondholders of the Galena Signal. President W. E. Moore of the Fidelity Trust made a statement in which he declared bondholders would not lose from the proceedings.

The two Galena Signal companies are generally classed as belonging to the J. S. Cullinan group, because of the part ownership in them that Mr. Cullinan and associates exercise. They are not, however, subsidiaries of the American Republic Corp., which is the holding corporation for the more definitely controlled Cullinan companies.

A large block of stock in the Galena Signal of Pennsylvania is owned by the Rockefeller Foundation, but no Standard Oil Co., as such, figures in its corporate affairs.

Donoghue's Dinner Suit Brings Comments

That civilization's conquest of the "Old West" has now been completed is the burden of a letter sent to David Donoghue, land and geological director of the Texas Pacific Coal & Oil Co., following recent references in this magazine to his "Horatio Alger rise from pick to dinner jacket."

The writer of the latest communication to Mr. Donoghue, in sending a carbon copy to NATIONAL PETROLEUM NEWS, asked for personal reason that his name should not be disclosed. Its epic character, however, necessitates reproduction, as follows:

"I have just read with consternation, in the columns of NATIONAL PETROLEUM NEWS, of your forthcoming debut as the paragon of what the well-dressed man will wear during the impending holiday season, both at the theater and at the afternoon social functions of our ultra-elite.

"This can mean but one thing: civilization's conquest of the 'Old West' has been completed. 'The days of old, the days of gold' are now but a romantic memory. While I shed a silent tear at this rather melodramatic exit, nevertheless I bid you God-speed none the less heartily, as you start your splendid adventure into the strenuous life of society's maddening whirl."

Foreign Opportunities

Reserved information may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, and its district and cooperative offices by duly registered firms and individuals upon written request by opportunity number. The Bureau does not furnish credit ratings or assume responsibility as to the standing of foreign inquirers; the usual precautions should be taken in all cases, and where no references are offered it does not necessarily imply that satisfactory references could not be given. Correspondence may be in English unless otherwise stated.

28289—**Paraffin**, Tallinn, Estonia, agency.
28318—**Paraffin**, Beunos Aires, Argentina, purchase and agency.
28324—**Paraffin**, Hamburg, Germany, purchase or agency.
28326—**Gasoline, kerosene and lubricating oil**, Wellington, New Zealand, purchase and agency.
28423—**Lubricating oil and grease**, Casablanca, Morocco, purchase and agency.
28431—**Mineral oils**, Venice, Italy, agency.
28440—**Paraffin**, Helsingfors, Finland, purchase.
28441—**Paraffin**, Hamburg, Germany, agency

Returns From World Tour

LOS ANGELES, Dec. 9.—Lee B. Mettler, manufacturer of a gas burner, returned to Los Angeles late in November after a trip around the world. Mr. Mettler was accompanied by his wife and they were absent from California for nearly ten months.

Transactions in Oil Shares on New York Stock Exchange

1926 High	1926 Low	1927 High	1927 Low		Listed Capital	Par Value	Stocks	Div. Rate	Last Paid	Transactions Sales	Week Ended Dec. 10 First	High	Low	Last	Change
32⅛	24¼	37⅝	27⅝	(sh)	916,675	N.P.	Amerada Corp.	50cQ	Oct. 30, 27	4,500	29⅝	28⅞	28½	29⅜	— ⅞
74	39⅞	76¼	35⅛	(sh)	209,180	N.P.	American Republics	.....	.....	79,400	70	76¾	68¼	71	+ 1¾
59½	44¾	50¼	38⅝	$	56,000,000	$25	Associated Oil	50cQ	Dec. 1, 27	80	39⅜	41	39⅛	39¼	+ ¼
128⅜	97	131⅜	107		50,000,000	100	Atlantic Refining	$1Q	Dec. 15, 27	65,800	112	112¼	104	106	— 6⅝
120	115½	118½	111½		20,000,000	100	do pfd	$1.75Q	Nov. 1, 27	.....	.....	.....	.....	.....	.....
33½	23½	35½	20⅜		25,000,000	25	Barnsdall Corp. A	s62½cQ	Nov. 15, 27	18,300	24½	24⅞	24	24¾	+ ⅜
29½	22½	32½	20½		3,842,400	25	do B	s62½cQ	Nov. 15, 27	100	24¼	24¼	24¼	24¼	+ ⅛
68⅛	29¾	32⅞	20		51,523,950	25	California Petroleum	25cQ	Dec. 1, 27	16,100	22⅜	23¼	21⅞	22½	0
94¼	50	96¾	65		24,355,000	100	General Asphalt	.....	.....	42,400	80¾	81	73¼	76½	— 4¾
140½	94⅞	144⅞	107¼		6,874,200	100	do pfd	$1.25Q	Dec. 1, 27	200	121½	121½	118	118	— 9
72	50¼	175¾	60⅛		25,000,000	100	Houston Oil	.....	.....	73,300	162	163	149	154⅛	— 7⅞
84	19⅝	32¾	17⅝	(sh)	500,000	N.P.	Independent Oil & Gas	25cQ	Oct. 31, 27	13,200	25	27¼	24⅞	26¾	+ 2⅛
13¾	7¼	12⅛	7½	$	3,280,340	$10	Indian Refining	.....	Dec. 15, 20	3,700	8¾	8⅞	8⅛	8⅞	+ ⅛
12½	8	12	7¼		4,550,110	10	do ctfs	.....	.....	1,300	8¼	8¼	8	8⅛	— ⅛
104	90	112	99		2,296,400	100	do pfd	.....	Dec. 15, 21	200	102	103	102	103	+ 1
24½	19⅛	36⅞	20½	(sh)	3,992,067	N.P.	Lago Oil & Transport	75cQ	Aug. 1, 27	5,300	33	33¾	32½	33	— 1
19⅞	12	18⅛	10	(sh)	1,131,290	N.P.	Louisiana Oil Refining	.....	.....	8,100	10½	10½	10⅛	10⅛	— ½
98	93	97	85¼	$	4,000,000	$100	do pfd	$1.½Q	Nov. 15, 27	710	87½	88¼	†85¼	87¾	— ¼
28⅞	16½	22¾	12	(sh)	330,000	N.P.	Maracaibo Oil	.....	.....	7,100	12½	14¾	12½	14½	+ 2⅜
63⅜	49¼	58½	31	(sh)	2,316,401	N.P.	Marland Oil Co.	.....	Mar. 31, 27	38,000	34	34½	33	33⅝	— 1⅛
250	225	250	200	$	45,942,800	$100	Mexican Petroleum	$3Q	Oct. 20,	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....		12,000,000	100	do pfd	$2Q	Oct. 20, 27	.....	.....	.....	.....	.....	.....
13¾	6	9¼	3	(sh)	945,839	N.P.	Mexican Seaboard	.....	Nov. 15, 24	3,800	5⅛	5½	4½	5	— ⅛
37	27½	39⅜	25½	(sh)	1,357,800	N.P.	Mid-Continent Petroleum	.....	Aug. 1, 27	12,200	28⅝	29⅜	27	27⅜	— ½
104¼	90	105	97	$	6,718,000	$100	do pfd	$1.75Q	Dec. 1, 27	.....	.....	.....	.....	.....	.....
2½	⅜	3⅜	1⅜		24,435,000	10	Middle States	.....	July 1, 23	3,000	2⅛	2¼	2	2	— ⅛
1⅜	½	2¾	1⅜		5,356,660	...	do ctfs	.....	.....	2,700	1⅝	1⅝	1½	1½	— ⅛
2¼	1	1⅞	1	(sh)	3,500,000	N.P.	Pacific Oil	.....	.....	3,300	1⅛	1⅛	1⅛	1⅛	0
76½	56½	65⅞	43¼	$	48,807,500	$ 50	Pan American P. & T.	$1Q	Oct. 20, 27	15,800	45¼	45½	†43¼	43⅜	— 1½
78⅜	56⅞	66⅜	43½		121,094,850	50	do B	$1Q	Oct. 20, 27	94,400	46⅛	46¼	†43½	44	— 2¼
46	30	37⅞	16¾	(sh)	400,000	N.P.	Pan American Western B.	.....	Jan. 30, 27	3,400	19	19⅜	18⅞	19¼	— ⅛
62	4½	18⅞	8	(sh)	198,770	N.P.	Panhandle P. & R.	.....	.....	3,800	14½	15¼	14⅜	14⅞	+ ½
99⅜	51	83¾	58¾	$	2,935,200	$100	do pfd	.....	July 2, 23	100	80⅛	80⅛	80⅛	80⅛	+ ⅛
57⅜	40	60¼	36½	(sh)	2,406,796	N.P.	Phillips Petroleum	75cQ	Oct. 1, 27	56,300	41	41½	39¾	41½	+ ½
1⅞	½	1⅛	½	$	29,622,925	$ 25	Pierce Oil Corp.	.....	.....	1,800	⅝	⅝	½	⅝	0
27⅛	11⅛	24	13½		15,000,000	100	do pfd	.....	Feb. 1, 22	300	17¼	17¼	17¼	17¼	— 1
7	2¼	5½	2¼	(sh)	2,500,000	N.P.	Pierce Petroleum	.....	.....	2,600	3⅝	3¾	3½	3½	— ⅛
20¾	11	33⅛	16¾	1	37,450,850	$50	Producers & Refiners	.....	Sept. 15, 23	10,100	25	25½	23¼	25⅜	+ ⅜
41¾	30¾	50	36⅞		2,845,350	50	do pfd	.....	May 1, 25	200	41½	42½	41¼	41¼	— ⅜
31	25¼	33¼	25		75,939,250	25	Pure Oil Co.	37½cQ	Dec. 1, 27	10,100	25⅝	25⅞	25¼	25½	0
112¾	106	115½	111⅜		13,000,000	100	do 8% pfd	$2Q	Oct. 1, 27	400	115½	*115½	114⅛	114⅛	— ⅞
57⅜	47⅜	58	45	(sh)	616,605	13.40	Royal Dutch, N. Y. shares	$1.80	Aug. 2, 27	1,400	47	47¾	47	47⅝	+ ⅝
40⅝	40½	47⅞	41⅜	(sh)	78,389	F2	Shell Transport & T.	$1.45	July 22, 27	100	43¾	43¾	43¾	43¾	— ¼
31	24	31¾	24⅝	(sh)	10,000,000	N.P.	Shell Union Oil	35cQ	Sept. 30, 27	11,000	26	26	25⅛	25¾	— ½
114	103	111	107½	$	18,350,400	$100	do pfd	$1.½Q	Nov. 15, 27	.....	.....	.....	.....	.....	.....
28⅝	15⅛	22¾	14¼		7,208,080	10	Simms Petroleum	.....	Apr. 1, 27	54,000	21¾	24	21½	23¾	+ 2¼
24⅞	16¾	22⅜	15	(sh)	4,501,339	N.P.	Sinclair Consolidated	.....	May 31, 24	20,600	17⅛	17¼	16½	17	— ¼
99½	90	103¼	97	$	16,907,000	$100	do pfd	$2Q	Nov. 15, 27	800	100	100	99½	100	0
37⅛	26⅝	37⅜	24⅛		27,396,590	25	Skelly Oil Co.	50cQ	Dec. 15, 27	465,900	26⅜	26⅜	25⅞	26¼	— ¼
63⅜	52⅜	60⅜	50⅜	(sh)	13,016,434	N.P.	S. O. California	62½cQ	Dec. 15, 27	20,400	55¼	55⅜	54½	54½	— ⅜
46⅜	37⅜	43¾	35⅛	$	606,243,050	$25	S. O. New Jersey	‡25cQ	Dec. 15, 27	36,400	39⅝	39¾	39¼	39½	—½
33¼	32½	34⅛	29¾		424,348,275	25	S. O. New York	40cQ	Dec. 15, 27	38,400	31½	31½	31	31	— ⅛
41⅜	30⅛	34⅞	30	(sh)	1,171,508	N.P.	Sun Oil	‡25cQ	Dec. 15, 27	2,600	31½	31½	30¾	30¾	— ⅞
...	...	101⅝	99	$	5,000,000	$100	do pfd	$1.50Q	Dec. 1, 27	300	100⅝	*101⅝	100⅝	100⅜	+ ⅜
5¼	1	6½	3¼	(sh)	1,121,368	N.P.	Superior Oil Corp	.....	Dec. 20, 20	4,800	3¼	3⅝	3¼	3¼	— ¼
57⅞	53⅛	58	45	$	180,428,225	25	The Texas Corp.	75cQ	Oct. 1, 27	29,500	53	53¼	52¾	52½	— ⅜
19½	12	18⅞	12		8,380,340	10	Texas Pacific Coal & Oil	15c	Sept. 30, 27	6,800	13¼	13½	13	13¼	+ ⅛
39¼	37	29⅜	19	(sh)	2,168,264	N.P.	Tide Water Oil Co.	20cQ	Sept. 30, 27	500	22⅜	22½	22¼	22½	— ½
103	87¼	90½	85	$	20,705,200	$100	do 5½ pfd	$1.25Q	Nov. 15, 27	2,100	86¼	88	86	88	+ 2
....	....	19⅛	15⅜	(sh)	4,795,934	N.P.	Tide Water Associated	.....	Aug. 1, 27	12,200	16¼	16½	15¾	16	0
....	....	90¾	85	$	72,795,900	100	do pfd	$1.50Q	Oct. 1, 27	3,500	87¾	88½	87½	88½	+ ½
5½	3	10¼	3¾	(sh)	3,742,029	N.P.	Transcontinental Oil	.....	.....	92,700	9	10	8⅞	9⅜	+ ½
58⅜	37¼	56½	39⅜	$	40,759,475	$25	Union Oil of California	50cQ	Nov. 10,27	7,000	43½	43½	42½	42½	— ½
120⅜	84¼	121½	94		30,734,000	100	Union Tank Car Co.	$1.25Q	Dec. 1, 27	3,600	116¾	121⅜	115	120½	+ 3
...	...	34½	24½	(sh)	240,000	N.P.	Warner Quinlan	50cQ	Oct. 1, 27	88,400	32⅜	*34½	30½	34⅛	+ 1¾
29¾	25⅜	27½	21¾	(sh)	490,000	N.P.	White Eagle Oil & Refining	50cQ	Oct. 20, 27	1,400	22	22	21¼	21½	0

*New High †New Low xEx-Dividend ‡Also extras s-Stock Total Sales 1,506,470

New York Curb Bonds

Week Ended Dec. 9

	High	Low	Last	Ch'ge
Beacon Oil 6s '36	101¾	100¾	101½	+ ½
Cities Service 5s '66	90½	89¼	90½	+ ⅜
Cities Service 6s '66	103½	102¾	103¼	+ ½
Cities Service C 5½s '42	95⅛	94⅞	95⅛	+ ¼
Empire Oil 5½s '42	94¼	94	94¼	+ ⅛
Gulf Oil 5s '37	101¾	101¼	101½	0
Independent Oil 6s '39	95¼	94½	95	— ½
Phillips Pet. 5¼s '39	95⅛	95	95	0
Richfield Oil 6s '41	97	95½	95¾	—1½
S. O. of N. Y. 6½s '33	104¼	104	104	— ¼
Sun Oil 6½s '39	101¾	101¾	101¾	0
Trans. Con't. Oil 7s '30	117	114½	115½	+1⅞
Valvoline 7s '37	104¾	104¾	104¾	0
Warner-Quin. 6s '42	101½	99½	101¼	+ ¼

Cleveland Stock Market

December 9

	Par Value	Bid	Asked	Last Sale
Canfield Oil Co.	100	...	...	...
do pfd	100	...	...	100
Fred G. Clark	10	2	3½	2
National Refining Co.	25	34½	35¼	34½
do pfd	100	131	...	132
Paragon Refining Co.	25	10¼	10½	10
do pfd	100	107½	110	108½

x Ex-Dividend

PITTSBURGH STOCK EXCHANGE

1926 High	1926 Low	1927 High	1927 Low	Par Value	Stocks	Transactions Sales	Week Ended Dec. 9 First	High	Low	Last	Ch'ge
8½	5¾	9⅛	6⅞	$ 10	Arkansas Nat. Gas	12,990	9	9⅝	9	9⅜	+ ½
90½	79¾	98⅝	80⅜	100	Columbia Gas	70	91½	91½	90⅛	90⅛	+ ¼
101⅜	95	107⅞	100	100	do pfd	.....	.....	.....	.....	.....	.....
17	12½	15	7½	10	Devonian Oil	80	7¾	7¾	7½	7½	0
116½	112	117½	115	100	Duquesne Lt. 7% pfd.	85	117	117	116½	117	0
10	5⅛	12¼	6	N.P.	Houston Gulf Gas	100	11½	11½	11½	11½	— ½
46	39	59¼	37¼	$25	Lone Star Gas	9,242	54	56¼	52	55¼	+ 1¼
47⅜	33⅛	22¾	22¾	25	Ohio Fuel Corp.	.....	.....	.....	.....	.....	.....
47½	42	21⅝	21	...	do ctfs	.....	.....	.....	.....	.....	.....
6¾	5	6	5	...	Ohio Oil & Gas	.....	.....	.....	.....	.....	.....
34	21	21	21	25	Oklahoma Nat. Gas	.....	.....	.....	.....	.....	.....
21	19¼	23⅝	20¼	...	do ctfs	.....	.....	.....	.....	.....	.....
5⅜	3⅛	3⅞	3	5	Pittsburgh Oil & Gas	230	3¼	3¼	3¼	3¼	0
10	7½	8	5½	10	Salt Creek Cons.	1,520	6½	6¾	6½	6½	0
27	8	26½	17	10	Tidal Osage	.....	.....	.....	.....	.....	.....
45	40	43	33	N.P.	Waverly Oil Wks. "A"	20	33½	33½	33½	33½	0

PITTSBURGH CURB EXCHANGE

1926 High	1926 Low	1927 High	1927 Low	Par Value	Stocks	Transactions Sales	Week Ended Dec. 9 First	High	Low	Last	Ch'ge
3⅜	2½	3½	2¾	$ 5	Columbia Synd.	.....	.....	.....	.....	.....	.....
20	.06	.18	.18	5	Duquesne Oil	.....	.....	.....	.....	.....	.....
91½	85	95	88	25	Gulf Oil Corp.	.....	.....	.....	.....	.....	.....
79	79	105	93	100	Houston Gulf Gas pfd.	.....	.....	.....	.....	.....	.....
12	7½	10¾	5⅝	N.P.	Leonard Oil & Dev.	1,200	5¾	5¾	†5⅝	5⅝	— 1⅛
30¼	29	32	31¼	$ 25	Oklahoma Gas	.....	.....	.....	.....	.....	.....
2	.15	2.70	.45	10	Omar Oil & Gas	11,100	†.45	.70	.45	.70	+ .20
....	....	9⅞	9⅞	....	Penn. Oil & Gas	200	9⅞	9⅞	9⅞	9⅞	0
....	....	2¼	1¾	....	Pittsburgh Oil Dev.	.....	.....	.....	.....	.....	.....
1	1¼	2¼	2¼	5	do pfd	.....	.....	.....	.....	.....	.....
33½	20	31	19	10	Plymouth Oil	.....	.....	.....	.....	.....	.....
7	3	6	5	5	States Oil	.....	.....	.....	.....	.....	.....
3½	2	3⅛	1½	1	Texon Oil & Land	2,100	2⅛	2⅛	2⅜	2⅜	— 1/16
25¾	8	23¾	18	10	Tidal Osage (non-vtg).	.....	.....	.....	.....	.....	.....

*New high †New Low xEx-Dividend

Standard Oil Stock Traded in New York

1926 High	1926 Low	1927 High	1927 Low	Outstanding Capital	Par Value	Stocks	Div. Rate	Last Paid	Transactions Week Ended Dec. 10 Sales	First	High	Low	Last	Change
21	16⅛	21⅝	17⅝	£ 4,000,000	£1	Anglo-American Oil	60¼c	May 31, 27	300	19⅛	19⅛	18⅞	18⅞	— ⅛
20¼	16½	20½	17⅜	.....	£1	do ctfs. non-voting	.....	.....	300	18⅝	18⅝	18½	18½	— ⅛
2¼	.75	3¾	.75	(sh) 500,000	N.P.	Atlantic Lobos	.....	.....	800	1½	1½	1⅜	1⅜	— ⅛
5	2⅛	6½	2½	$ 000,000	$ 10	do pfd	.....	.....	100	3½	3½	3½	3½	— ¼
75	65	69	50	1,000,000	25	Borne Scrymser	‡$1S.A.	Oct. 15, 27	.....	.....	.....	.....	.....	.....
59¼	42	60	45	10,000,000	50	Buckeye Pipe Line	$1Q	Dec. 15, 27	400	59	59	57	57	— 1¾
82½	65	126	76½	3,000,000	25	Chesebrough Mfg	$1Q	Sept. 30, 27	200	121	121	120¼	120¼	— 1
25⅞	17½	22⅝	16¼	38,805,260	10	Continental Oil	25cQ	Sept. 15, 27	.....	.....	.....	.....	.....	.....
137	102	137	89	3,000,000	100	Cumberland Pipe Line	$2Q	Dec. 15, 27	.....	.....	.....	.....	.....	.....
63¾	43	68½	47	5,000,000	100	Eureka Pipe Line	$1Q	Nov. 1, 27	250	68½	68½	66	66	— 2
32½	9⅛	13½	6½	16,000,000	100	Galena Signal Oil	.....	June 30, 25	200	7⅛	7⅜	6	6	— ¼
94½	35	59¾	31	4,000,000	100	do new pfd	.....	June 30, 26	280	34	34½	25	25	—12
97½	40	60⅛	36	2,000,000	100	do old pfd	.....	June 30, 26	140	46	46	45	45	— 1
99⅝	52	68¼	54	73,117,577	25	Humble Oil & Refining	‡30cQ	Oct. 1, 27	9,900	65⅛	65½	64¼	64⅜	— 1⅛
144½	125¼	182	123¾	20,000,000	100	Illinois Pipe Line	$6S.A.	Dec. 15, 27	1,250	177	177	172¼	177	0
39¾	32½	64¾	37¾	(sh) 6,491,952	N.P.	Imperial of Canada	‡25cQ	Dec. 1, 27	15,300	60⅝	62½	59½	60⅛	— ⅝
70	54¼	94½	61	$ 5,000,000	$50	Indiana Pipe Line	‡$1Q	Nov. 15, 27	900	75	75½	72	75½	+ ½
35¼	28¾	39	28	(sh) 7,118,138	N.P.	International Petroleum	25c	Nov. 15, 27	76,000	34½	39	34½	37	+ 1⅞
20⅝	12½	24	13½	$ 6,362,500	$12½	National Transit Co	25cQ	Dec. 15, 27	1,600	22¾	22⅞	20	20	— 2⅞
51½	27½	44⅛	31¼	5,000,000	100	New York Transit	.....	July 15, 26	100	40¼	40¼	40¼	40¼	— 1¾
80½	64	100	70	4,000,000	100	Northern Pipe Line	$3S.A.	July 1, 27	350	99	99¾	99	99¾	— ¼
67⅜	55¾	67⅞	52	60,000,000	25	Ohio Oil Co	‡50cQ	Dec. 15, 27	3,500	64¾	65	63¼	64	— ¾
24¾	15	38½	12	10,000,000	25	Penn Mex. Fuel	.....	May 21, 25	3,900	32	33	31⅛	32¼	+ ¼
60¼	48	55½	45⅜	60,000,000	25	Prairie Oil & Gas	.....	Aug. 31, 27	3,900	48¾	49	48¼	48¾	— ⅛
137½	122¼	190	132	81,000,000	100	Prairie Pipe Line	$2.50Q	Oct. 31, 27	1,600	181	185	178	185	+ 3½
220	184½	201½	175½	4,000,000	100	Solar Refining	$5S.A.	June 20, 27	30	181	181	180	180	— 1
27	21	27¼	15½	5,000,000	50	Southern Pipe Line	$2	Dec. 1, 27	300	22	22	22	22	— ¼
50	34½	41½	34½	20,000,000	25	South Penn Oil	50cQ	Sept. 30, 27	600	38¾	39	38	38	— 1
57	49	111½	111⅛	3,500,000	100	South West Pa. Pipe Lines	$1Q	Oct. 1, 27	.....	.....	.....	.....	.....	.....
70½	60½	81⅜	64⅜	228,415,463	25	S. O. Indiana	‡62½cQ	Dec. 15, 27	18,100	79¼	79⅛	76⅝	77¼	— 1¾
36½	16½	20⅞	15⅜	8,000,000	25	S. O. Kansas	.....	June 16, 24	400	15¾	15¾	15⅛	15⅜	— ⅛
134¾	108	130	111¾	17,012,599	25	S. O. Kentucky	$1Q	Sept. 30, 27	11,000	121½	124¼	121½	123¼	— ¾
51⅛	42	49½	42	4,559,850	25	S. O. Nebraska	63cQ	Sept. 20, 27	400	43	43	42¼	42¼	— 1⅛
672	288	863¼	73	14,000,000	25	S. O. Ohio	62½cQ	Oct. 1, 27	750	78	78	76½	77¾	— ¾
120½	116½	122	117¼	7,000,000	100	do pfd	$1.75Q	Dec. 1, 27	.....	.....	.....	.....	.....	.....
23	15½	127	14½	861,466	25	Swan Finch Co	.....	Nov. 1, 19	.....	.....	.....	.....	.....	.....
109¾	90¼	149¾	95¼	62,470,800	25	Vacuum Oil	‡50cQ	Sept. 20, 27	7,100	143⅛	143⅛	139⅝	141¾	—

*New high †New low xEx dividend ‡Also extras.

New York Curb Market

1926 High	1926 Low	1927 High	1927 Low	Par Value	Stocks	Transactions Week Ended Dec. 10 Sales	First	High	Low	Last	Change
6¾	45	2⅛	.55	$5	Amer. Con. Oilfields	46,000	.90	.90	.82	.85	— 4
14½	4	7½	3	N.P.	Amer. Maracaibo	5,600	3	3	2¾	2¾	— ¼
8⅝	5⅜	9¾	6¾	$10	Arkansas Nat. Gas	4,000	9	9¾	9	9⅜	+ ⅛
20⅛	14⅛	20⅛	15½	N.P.	Beacon Oil	.....	.....	.....	.....	.....	.....
85¼	60	49	20½	N.P.	British American	1,800	40	49	37	37½	— 1½
28⅜	9¼	28¼	14⅜	25c	Carib Syndicate(new)	4,500	19	19¼	18⅛	18⅛	— ⅞
.....	.....	26	16½	...	do ctfs. of deposit	.....	.....	.....	.....	.....	.....
51	37½	58¾	40¼	$20	Cities Service	18,000	51⅝	51⅞	51⅝	51⅞	0
92½	82⅝	95	87	100	do pfd	4,100	94⅝	94⅞	94⅝	94⅞	0
8⅜	7⅜	8¾	7⅜	10	do pfd. B	700	8¾	8¾	8¾	8¾	0
25¼	19	29¼	22½	10	do banker's shares	.....	.....	.....	.....	.....	.....
3½	1⅜	3½	1¾	$1	Colombia Syndicate	26,500	1⅝	1⅝	1¼	1⅛	— ⅛
10¾	8¾	9½	6¾	10	Consolidated Royal	100	6¾	7	6⅝	7	+ ¾
16	10	14¾	9⅛	N.P.	Creole Syndicate	27,000	10	10⅛	9⅞	10	0
7⅜	1½	3	x63	N.P.	Crown Central	500	.80	.80	.76	.76	+ 1
8½	½	12	4	...	Darby Petroleum	1,000	7¾	8⅛	7	7	— ½
.....	.....	11⅜	5	...	do trust ctfs	100	7⅞	7⅞	7⅞	7⅞	+ ½
4	1¾	2½	1¼	N.P.	Derby Oil & Refining	.....	.....	.....	.....	.....	.....
19	13	16¾	7	N.P.	do pfd	200	7	7	7	7	0
7½	2½	3¾	1	N.P.	Gibson Oil	31,500	1⅞	2⅛	1¾	2⅛	+ ¼
2	.63	1⅝	40	N.P.	Gilliland ctfs	100	51	51	51	51	+ 1
98	82	105⅞	86¼	$25	Gulf Oil Corp	5,700	104⅞	104⅞	98	99	— 5⅝
3⅜	1	2¼	1⅜	N.P.	Kirby Petroleum	1,800	1⅝	1⅝	1½	1½	— ⅛
12¼	5¾	10⅞	5⅛	N.P.	Leonard Oil & Dev	6,200	5⅜	6	5½	5½	— ¼
27	20	27½	20	N.P.	Lion Oil & Refg	200	22⅜	22⅜	22¼	22¼	— ⅛
46	31	59⅜	37	$25	Lone Star Gas	3,200	54½	56½	52⅜	56	+ 2
2¼	2	2⅞	.87	1	Magdalena Synd	6,600	1¾	2	1⅜	1⅝	+ ⅛
5½	1⅜	3	1⅜	10	Mexican-Panuco	.....	.....	.....	.....	.....	.....
1¾	1¼	1½	1	1	Mountain & Gulf	.....	.....	.....	.....	.....	.....
26	23	26½	22¾	10	Mountain Producers	10,500	26	26½	25¾	25¾	— ⅜
6¾	5	5¼	4⅜	5	New Bradford	800	5¼	5¼	5	5⅛	0
11¾	2	6¼	4	10	New England Fuel	.....	.....	.....	.....	.....	.....
17	9⅛	16	9¼	1	New Mex. & Ariz	2,900	11¼	11¼	10	10	— ⅝
17	8	13¼	9	25	New York Oil	1,400	....	11½	11	11½	+ ⅜
12⅛	8¾	12⅜	10	N.P.	North Cent. Texas	.....	.....	.....	.....	.....	.....
44¾	33	....	....	$25	Ohio Fuel Corp	.....	.....	.....	.....	.....	.....
33	28½	27½	21¼	...	Okla. Nat. Gas ctfs	.....	.....	.....	.....	.....	.....
10⅛	5⅞	9⅛	1¾	N.P.	Pandem	39,000	4⅛	5⅜	4	4½	— ¾
12¼	11¾	12⅞	7	N.P.	Pantapec Oil	.....	.....	.....	.....	.....	.....
2¾	.20	.37	.25	N.P.	Peer Oil Corp	.....	.....	.....	.....	.....	.....
22¾	12	13¼	5⅛	$10	Pennok Oil	2,800	6⅞	6⅞	5⅛	5⅛	— 1¾
38	14⅜	24⅝	7	25	Red Bank Oil	500	10⅛	12	9⅜	12	+ 2
30¼	12	15¾	2	N.P.	Reiter-Foster	4,400	6⅛	7	5⅞	6⅞	+ ¾
27½	22	27½	15	$25	Richfield Oil	600	25	25¼	25	25	+ 1¼
7½	4½	7	4½	N.P.	Ryan Consolidated	100	5	5	5	5	— ¼
10	7½	8	6	$10	Salt Creek Cons	1,200	6½	6¾	6½	6⅝	— ⅛
36	26¾	33	27¼	10	Salt Creek Prod	28,600	32	33	31¾	32	— ¾
4⅜	1⅜	7	2	5	Savoy Oil	100	2	2	2	2	0
27	7⅜	26½	17	10	Tidal Osage	1,300	20	21⅛	20	21	0
25¾	7⅜	23¾	15	10	do non-voting	2,500	18⅞	19⅞	18½	18½	— 1½
.....	.....	89	63½	100	Transcontinental pfd	400	86	87	86	87	0
3	4⅛	7⅛	4¼	5	Venezuelan Petrol	3,500	5	5	4⅞	4⅞	— ⅛
31½	22	32⅜	20⅜	N.P.	Wilcox Oil & Gas	2,900	22	22	21	21	— 1½
9½	4⅜	8	4¾	$1	Woodley Petroleum	300	5½	5¾	5⅝	5¾	+ ¼

*New High †New Low xEx Dividend

New York Bonds

Week Ending Dec. 9

	High	Low	Last	Ch'ge
Amer. Rep. deb. 6s	102½	102	102⅛	— ⅝
Assoc. Oil gold 6s	103	102¾	102⅞	— ⅛
Atlantic Refg. deb. 5s	102¾	102¼	102¼	— ¼
Barnsdall Corp. 6s	100⅝	100	100½	0
Barnsdall Corp. 6s ex-war	90½	89⅜	90¼	+ ¼
Cal. Pet. 5s	96	95½	96	+ ½
Cal. Pet. 5½s	100⅝	100¼	100⅛	— ½
General Asphalt 6s	109¾	108	108⅛	—1⅛
General Petroleum 5s	102¼	102	102¼	+ ¼
Humble Oil & Refg. 5½s	102⅞	102⅝	102¾	0
Humble Oil 5s wi	100¼	100	100¼	+ ⅛
Mid-Cont. Pet. 6½s	105⅜	105	105	— ½
Pan Amer. P & T 7s	105⅜	105⅜	105⅜	0
Pan Amer. P & T 6s	103⅛	102¾	102¾	— ⅜
Pan Amer. P & T 6s	95½	95½	95½	—1
Prod. & Refiners 6s	111½	111	111	— ¼
Simms Pet. cvt. 6s	105⅝	103½	105	+1
Sinclair Con. Oil Col 7s	99	98½	98½	0
Sinclair Con. Oil con. 6½s	94¾	94¼	94¼	+ ⅛
Sinclair Con. Oil 6s-D	96¾	96½	96½	— ¼
Sinclair Crude Oil 6s	100⅛	100	100⅛	0
Sinclair Pipeline 5s	93⅜	93	93½	— ⅛
Skelly Oil 5½s	95	94¾	94¾	— ¼
S. O. of N. Y. 4½s	97⅝	97¼	97⅜	— ⅛
S. O. of N. J. deb. 5s	104½	103¼	103¼	—1
Superior Oil 7s	101⅛	101⅛	101⅛	0
Union Oil of Calif. 6s-A	109⅞	109½	109⅞	+ ⅛
Union Oil of Calif. 1st 5s	102	101¾	101¾	0
Union Oil of Calif. 5s C	99⅞	99¾	99¾	— ⅛

Oil Dividends

	Amount	Stock Payable	of Record
Humble Oil q	30c	Jan. 1	Dec. 12
do extra	20c	Jan. 1	Dec. 12
Indiana P. L. q	$1	Feb. 15	Jan. 20
do extra	$1	Feb. 15	Jan. 20
Salt Creek Cons. q	20c	Jan. 2	Dec. 15
Tide Water Assoc. pfd q.	$1.50	Jan. 3	Dec. 16
Tide Water q	20c	Dec. 31	Dec. 16

CHICAGO, Dec. 10.—Champion Pneumatic Machinery Co., manufacturer of air compressors, air towers, car washing and paint spraying equipment, will exhibit its line at the National Automobile Shows to be held at New York from Jan. 7 to 14, and at Chicago, from Jan. 28 to Feb. 4.

Fire Destroys Offices At Champlin Plant

ENID, Dec. 10.—Fire completely destroyed the building housing the general offices of the Champlin Refining Co., and the H. H. Champlin Hardware Co. on Dec. 8. The loss is estimated at approximately $300,000.

The fire was discovered shortly after 1 a.m. Many of the records in steel cabinets were not damaged seriously. The large vault has not been opened, but it is thought the most valuable records which were in it are intact.

Duplicates of most of the orders were at the refinery offices and by 9 a.m. Dec 8 the sales and traffic departments had established offices in the Elks hall. L. A. Snyder, salesmanager, reported that all shipments went out on schedule.

Today the offices were moved to Convention hall pending the erection of a new, fireproof building. A duplicate order already has been placed for the steel furniture with which the refining company's offices were equipped.

Begin Refining Changes

LOS ANGELES, Dec. 9.—Improvements are being started this week by the Edington-Witz Refining Co. at the old Wadeolene refinery on Cherry avenue, Long Beach, and oil should be running within the next three weeks. New stills and other new equipment are to be installed. Provision is being made for additional shipping, receiving and storage facilities. Contracts have been made for the production from a number of wells at Signal Hill, necessitating connecting pipe lines. The daily crude through put will be about 3000 barrels. The company is planning to distribute its products wholesale.

Beacon To Issue Stock

BOSTON, Dec. 10.—Beacon Oil Co. is planning to issue approximately 200,000 shares of common stock at $15 a share, following increase in authorized capital stock from 1,000,000 to 1,500,000 shares. Beacon has 704,000 shares of common stock outstanding. Part of the new stock will be for subscription by employes.

Pennok Omits Dividend

NEW YORK, Dec. 9.—Pennok Oil Corp., which has been paying 25 cents a share a quarter this year has omitted its dividend for the fourth quarter, announcing that it intended to conserve its cash. Last year Pennok paid 50 cents a share a quarter and before that 37½ cents a share.

THE OIL INDUSTRY EXCHANGE

Positions Wanted

YOUNG MARRIED MAN, with several years experience designing and erecting bulk plants and filling stations, two years at selling equipment, and thoroly acquainted with all kinds of stations and bulk plant equipment, wishes to connect with some large oil company in any capacity, construction, service man, purchasing department or any position that holds a future for a hard worker. Also some experience in the management of filling stations and wholesale plants. At present employed. Address Box 988.

SALESMAN DESIRES NEW CONNECTION. Acquainted with all jobber tank-car lubricating buyers in thirteen middle Western States and Canada including Winnipeg West. Nineteen years experience in all branches of oil industry; forty years old and married; good habits; willing to headquarter anywhere providing opportunity for advancement is prospective. Address Box 984.

ARE YOU A JOBBER desiring the services of a young man capable of handling correspondence, accounting, advertising and sales work? My experience and training should make me particularly desirable to a marketer who operates bulk and filling stations and whose business is not sufficient to justify complete departmentalization. Age 27, college graduate, two years post-graduate business, 1½ years varied experience major oil company, well acquainted with jobbing business through association with successful jobber. References. Address Box 985.

Situations Open

SALESMEN: Full or part time—Men calling on or acquainted with oil companies, independent stations and garages. We have a splendid proposition, a product of highest merit, a growing demand and a handsome return to you. Our proposition is of special interest to equipment men. In replying give full information regarding yourself and territory covered. Address Sales Manager, 1813 Fond du Lac Ave., Milwaukee, Wis.

SALESMEN WANTED

who are calling on the filling station trade regularly and in position to take on a worthwhile specialty as a sideline on commission basis. Manufacturer located in Middle-West in position to ship advantageously over wide territory.

Address Box 987

A SALESMAN

Successful salesman experienced selling power plants can secure permanent, profitable connection. Acquaintance with industrial buyers desirable. Proven products, backed by a Surety Bond. Sell to every industrial plant, public institution, hotel and all buildings. 100% co-operation. Personal training given. Give details. Replies confidential. Position available January 1st, 1928.

THE NORTH AMERICAN FIBRE PRODUCTS CO.

Cleveland Ohio

Situations Open

POWER PUMP AND OIL EQUIPMENT SALESMAN WANTED. Must know power pump trade and large and small oil companies in Missouri, Kansas, and Oklahoma. Position open with old reputable concern. Correspondence will be kept confidential. In answer give complete history and qualifications for the position. Address Box 986.

For Sale

IDLE AND PORTABLE SOUTHWESTERN EQUIPMENT. Fractionators, absorbers, stills, condensers, exchangers and complete plants. Priced to move. W. F. Pyne, 909 So. Ardmore Ave., Los Angeles, California.

BULK STORAGE PLANT FOR SALE in middle west; also four to six good filling station leases. Gallonage in excess of 100,000 monthly. Unless you mean business do not reply. Address Box 977.

SIX MILWAUKEE FIVE-GALLON VISIBLE ELECTRIC GASOLINE PUMPS for sale. $60 each f.o.b. Marion, Illinois. Address Mitchell Oil & Gas Company, Marion, Ill.

ONE THREE-COMPARTMENT 1150-GALLON GASOLINE TANK TRUCK complete for sale. Now in service. Address Damascus Manufacturing Corporation, Cleveland, Ohio.

FOR SALE
2 GAS OR OIL ENGINES
A BARGAIN

2 cyl. 80 HP Gas engine (Bogart) good as new—$1650.00
Single cyl. Oil engine 40 HP (Olin) Good condition
Write Niagara Motors Corp. Dunkirk, N. Y.

Turn Your Outgrown Equipment Into Money

Some of our 15,000 readers are in the market for it right now.

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"For Sale," "Wanted to Buy," "Help Wanted," "Business Opportunities," "Miscellaneous" classifications, set in type this size without border—10 cents a word. Minimum charge, $3.00.
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All advertisements carried on this page are payable in advance.

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